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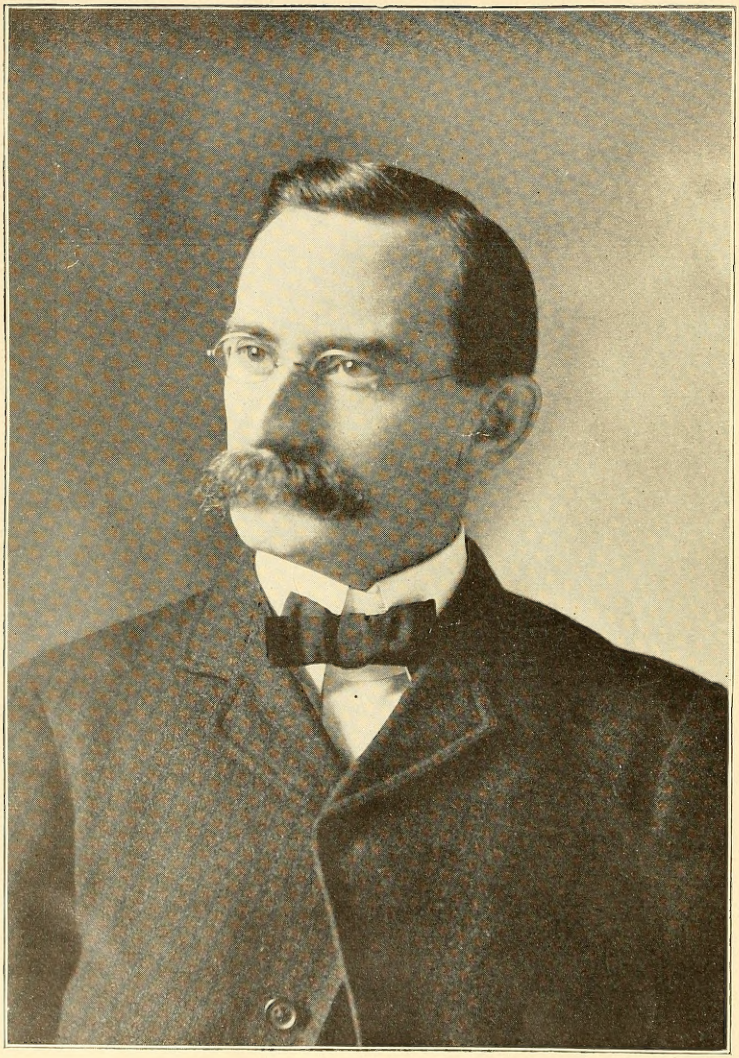

Geo. F. Thompson

A MANUAL

OF

ANGORA GOAT RAISING

WITH A CHAPTER ON

MILCH GOATS.

By GEORGE FAYETTE THOMPSON, M. S.

BUREAU OF ANIMAL INDUSTRY

AUTHOR OF

"Information Concerning the Angora Goat," "The Angora Goat," and "The Angora Goat Industry in 1901."

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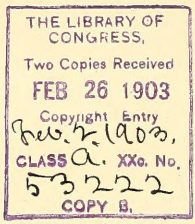

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TO my father, Rev. R. S. Thompson, whose solicitude for my welfare in youth has never been forgotten, whose Christian character has ever been my guide, and whose patient industry has ever been my inspiration, I dedicate this little work in deep affection.

THE AUTHOR.

PUBLISHERS' ANNOUNCEMENT.

The remarkable development of the Angora and mohair industry in this country during the last three years and the widespread demand for definite and reliable information concerning the breeding and raising of this class of goats and the production of mohair, emphasized by more than one hundred thousand letters of inquiry, a large number of which have come directly to the office of the American Sheep Breeder, have made apparent the desirability of and necessity for a manual or hand-book concise and cheap enough to be within the reach of all, and yet comprehensive enough to meet the wants of new beginners as well as veteran breeders. To meet this demand we are pleased to present this volume—"Angora Goat Raising and Milch Goats." The author, Prof. Geo. F. Thompson, the distinguished editor of the U. S. Bureau of Animal Industry, is the recognized authority in this country upon the subjects herein treated. The book is the result of years of painstaking study and research, and we offer it to the American public in the belief that it will meet a warm welcome and subserve the purpose for which the gifted author prepared it. The industries treated in these pages are yet in their infancy and manifestly have a great future. The demand for Angoras and mohair is far in excess of the supply and likely to remain so for many a year to come. We have many millions of acres of rough mountain, hill and brush land eminently suited to the goat industry, but unsuited to any other domestic use, that may be profitably devoted to the raising of Angoras and mohair, and until these are utilized, the mission of this book will not be wholly fulfilled. Coincident and coextensive with the Angora movement is a general awakening of interest in milch goats, especially in the towns and cities and among the leading physicians, hospitals and sanitariums. Our author gives an admirable summary of up-to-date information upon this subject, which we are sure will be received with marked approval.

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PREFACE.

A wonderful interest has been manifested in the Angora goat industry during the last three years. Breeders and editors of live-stock papers have been overwhelmed with correspondence concerning these beautiful and useful animals. The Bureau of Animal Industry, burdened beyond anyone else probably with this correspondence, assigned to me the duty of preparing a bulletin on the subject. It was the purpose of that bulletin to answer all the inquiries that were made, and it met with a hearty reception everywhere.

That bulletin is now out of print. The demand, however, for a manual on goat raising is still very strong. Every day scores of farmers decide to investigate the industry with a view to engaging in it, and their first desire is for such information as may be found in this work. The information given herein is drawn from various sources—a thorough review of all literature on the subject, much correspondence with Angora goat men, personal acquaintance with nearly all of the leading Angora breeders in the United States, and some practical experience.

The author desires to acknowledge here his obligations to persons and documents that have been helpful in the preparation of this volume. He is specially indebted to Mrs. Sallie Russell Reeves, Dr. W. E. Griffith, and Charles M. Daugherty, and to many others, mentioned elsewhere, who have furnished photographs. A list of the books which have proved very helpful, especially in the preparation of the chapter on "milch goats," is appended below.

THE AUTHOR.

Die Ziegen und Kaninchenzucht. Von Dr. William Löbe. Pp. 80. Berlin, 1875.

Die Ziegenzucht in Deutchland. Ihre Mängel und Mittel zu ihrer Hubung. Von Peter Petersen. Pp. 78. Berlin, 1899.

Leitfaden für die Berbreitung, Pflege und rationelle Zucht der Ziege mit Verücksichtigung ihrer land und volkswirtschaftlichen Bedeutung. 2d part. Von. Fr. Dettweiler. Pp. 72. Darmstadt, 1896.

Die Hausziege, das Milchtier des kleinen Mannes, ihre Naturgeschichte, Geschichte, Rassen, Schläge, Nutzverwertung, Haltung, Pflege, Fütterung and Zucht. Von Docent Dr. Ernst S. Zürn. Pp. 72. Leipzig, 1901.

Die Zeigenzucht. Krankheiten der Ziegen, deren Heilung und verhütung. Von A. v. Renesse. Pp. 37. Münster i. W., 1901.

Die Ernährung und Haltung der Ziege als Milchtier des Kleinen Mannes. 2d edition. Von Dr. G. Kloepfer. Pp. 62. Essen, 1896.

Rind, Schaf, Ziege und Schwein. Von J. G. Obst. Pp. 41. Leipzig.

Milch Goats and Their Management. By Bryan Hook. Pp. 115. London.

La Chevre. Races, Elevage, Malaaies, Produits de la Chevrerie. Par Huart du Plessis. Paris.

INTRODUCTION.

So far as history enlightens us, the goat has always been one of the best-known domestic animals. How long he has been in disfavor simply because he was "nothing but a goat" and been the subject of every funny man's joke, we are unable to say. The oldest accounts show him to have been a most useful animal in the furnishings of hair for curtains, skins for clothing and tents and meat for the tribes, yet down to this day he has been maligned beyond reason, and that, too, by those who have worn his skin as gloves and shoes and capes, his hair as the finest of furs and expensive dress goods, and eaten his flesh as delicious lamb.

There has recently been an awakening in the United States, especially among those who are ever ready to welcome and to dignify any industry that is honorable and bids fair to pay dividends. And so it is that the Angora goats, the finest breed of the goat family, is now receiving the credit that has long been their due. His usefulness is manifested in various ways, as is shown in the several chapters of this volume. The fleece, technically called "mohair," furnishes some of the finest fabrics known among ladies' dress goods, as well as plushes, robes, rugs, etc.; their habit of browsing admits of their being put to an economic use as brush destroyers, thus enabling the farmer to subjugate his brushwood with little or no aid from the ax; their flesh is exceedingly delicate and nutritious and it finds a ready market; the milk, though not so abundant as with the established milch breeds of goats, is richer than cow's milk, and approaches very closely human milk in quality; their tanned skins are not suitable for shoe leather, owing to their peculiar texture, but good work gloves and morocco for book binding are largely made from them; their pelts, when properly dressed, make rugs and robes of striking beauty and great utility; owing to their freedom from goat odor, so well known of common goats, and especially of their great attractiveness and docility, they make the very finest pets for children; a few of them among a flock of sheep are in a measure a protection to the sheep against the invasion of dogs; their manure is noticeably helpful to the grass which springs up under them as they clear away the underbrush.

These are all subjects of varying degrees of importance, and will be discussed quite fully in this little volume.

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A MANUAL

OF

ANGORA GOAT RAISING.

CHAPTER I.

ORIGIN AND HISTORY OF THE ANGORA GOAT.

Historical Scope of this Volume.

Whoever would undertake at this time to add anything concerning the origin and history of the Angora goat to that which has been published by S. C. Cronwright Schreiner,[1] or indeed attempt to improve upon his facts, will be confronted with a task well nigh impossible. The purpose of the writer hereof is to present to the Angora goat raisers a manual for every-day use, rather than a discussion of a history that is at best quite nebulous, and therefore he will content himself with such a brief historical survey as will logically lead to a proper consideration of the goat itself and its adaptability to the varying conditions of the climate and the soil of our country. Breeders generally are busy men and they will probably extend a more generous welcome to this volume if it condenses history and hastens on to measures of more importance. No thought is in mind of belittling the value of history to the student of any art or science, but an author should not add cost and inconvenience to a manual by giving a history in much detail of the subject treated.

Origin of the Angora Goat.

There are about ten species of wild goats, according to naturalists, and all of them, except possibly the Rocky Mountain goat,

[1]The Angora Goat. Pp. 296, New York. 1898.

are confined to Europe and the Himalayas of Asia. These are divided into two groups, as follows:

I. *The ibexes.*—These according to Hayes, have, as a distinctive characteristic, horns "flat in front, with a horizontal triangular section, furnished with large transversal knots."

II. *Goats proper.*—These, according to Hayes, have horns compressed and carinated in front, and, according to Wood, "may be distinguished from the ibex and the sheep by the peculiar formation of the horns, which are compressed and rounded behind and furnished with a well-developed keel in front."

There are two subspecies of this second group—*Capra falconeri* and *Capra ægagrus.* The latter is known as the Paseng, the Bezoar goat, or wild goat, or Persia, and is now generally accepted by naturalists as the goat from which the Angora is descended through *Capra hircus,* which is claimed to be the ancestor of all common breeds of goats.

As to the parent of the Angora stock, there is a difference of opinion between the two best-known writers on this subject—John L. Hayes, author of The Angora Goat, etc. (1882), and S. C. Cronwright Schreiner, author of The Angora Goat (1898). The one takes the position that it is descended from *Capra falconeri,* the other from *Capra ægagrus.* Owing to the additional information which has been obtained since the appearance of Hayes's book and which is embodied in Schreiner's work, there can hardly remain a doubt of the correctness of the contention that the Angora goat descended from *Capra ægagrus.*

Schreiner, who has made extensive research, has described these two subspecies as follows: "*Capra falconeri* has a beard which extends from the chin to the shoulders and chest, and long spirally twisted horns, the twist being outward from the base. The males, when old, become whitish all over. The ewes have a beard confined to the chin, and small horns with a slight spiral twist. It is a native of the Western Himalayas, northern Afghanistan, and possibly of Persia; it is also found generally in Cashmere and on the Tibetan side of the Himalayas. Fossil remains show that it is one of the oldest types of goats.

"*Capra ægagrus*[1] is chiefly remarkable for its enormous horns, which are larger proportionately than in any other ruminant

[1]There is evidence that in classic times this goat was widely distributed over the Grecian Archipelago, although in Europe it is now found only in Crete, the island of Antemelo, in the Cyclades, and perhaps also in Guire to the northeast of Eubea. Eastward it is found in the hills and mountains of Asia Minor, being especially common in the Taurus range, and it extends thence through Persia into Baluchistan, Sind, and Afghanistan. In India its range does not extend beyond the western side of Sind. It is found in Sind and Baluchistan in hills a little above the sea level; in the mountains of Persia it ascends to an elevation of 11,000 feet to 12,000 feet.—Schreiner.

animal; they approximate the triangular in form, transversely rigid, and are bent backward as in the domestic varieties, being scimitar-like in shape and curve, and having no spiral twist. Large horns of *Capra ægagrus* measure 40 inches along the curve, but a length of upward of 52½ inches, with a basal girth of 7 inches, has been recorded. It stands somewhat higher than any of the domesticated varieties of the goat (an adult male stood 37 inches at the withers), from which it further differs in its short and powerful neck, its stouter limbs, and slender body. In the female the horns are exceedingly diminutive or are altogether wanting. The fur, which over the greater part of the body is short, is of a grayish brown color, with a black line running along the entire length of the back, while the under surface of the neck and the beard, which is present in both sexes, are of a brown color. In the winter coat the hair on the neck and shoulders is rather longer than elsewhere, and in the same season, in the colder part of the animal's habitat, a coat of woolly fur is developed beneath the hair."

Native Habitat of the Angora Goat.

At this time we can trace the history of the Angora goat back to the vilayet of Angora, in Asia Minor, and this location is usually given as the place of its origin. Some have ventured to say that these goats were introduced there 2,400 years ago, but there is no reliable information extant bearing upon this point.

There is pretty strong evidence which goes to show that they were a distinctive breed when Moses was leading the Israelites out of Egypt. Goats' hair was spun by the Israelites for curtains and other purposes for use in the temple.[1] In the story recorded in I Samuel (chapter 19) of the artifice of Michal in deceiving the messengers of Saul by placing an image in the bed in place of David and giving it a pillow of goats' hair, is believed by Pennant to refer to a pillow made of the Angora fleece.

The city of Angora, or Engurieh, the capital city of the vilayet of Angora, is the ancient Ancyra, and is located about 220 miles south by southeast from Constantinople. Angora was the seat of

[1]Take ye from among you an offering unto the Lord; whosoever is of a willing heart, let him bring it, an offering of the Lord; gold, and silver, and brass, and blue, and purple, and scarlet, and fine linen, and goat's hair.—Exodus xxxv, 5, 6.

And every man, with whom was found blue, and purple, and scarlet, and fine linen, and goat's hair, and red skins of rams, and badgers' skins, brought them.—Exodus xxxv, 23.

And all the women whose heart stirred them up in wisdom spun goats' hair.—Exodus xxxv, 26.

And he made curtains of goats' hair for the tent over the tabernacle; eleven curtains he made them. The length of one curtain was thirty cubits, and four cubits was the breadth of one curtain; the eleven curtains were of one size.—Exodus xxxvi, 14, 15.

one of the earliest Christian churches, and was probably established by the Apostle Paul. The province is mountainous to a considerable extent and furrowed by deep valleys. It is about 2,900 feet above the level of the sea. Of the climate Mr. H. A. Cumberbatch, British consul at Angora (1895), and quoted by Schreiner, says: "The climate is extreme. In the months of January and February the thermometer will mark a minimum of 10° F. for several days at a time, reach as far as 0° F., whilst in June and July the maximum readings of 85° F. are maintained day after day, with little or no rain. The country is covered with snow in the winter, rain and snow falling frequently. In 1894 the total rainfall at Angora was 8.12 inches, but that was an exceptionally dry season. For the first six months of 1895 the rainfall was 10.10 inches, which is somewhat above the average; the heaviest rainfall in twenty-four hours having been 1.20 inches."

The following description is by a native Turk, who was once connected with the Bureau of Animal Industry: "Asia Minor, in general aspect, is an extensive peninsula, projecting like a bridge from the main mass of the Eastern continent towards Europe. Elevated plains occupy a great part of the interior, intersected and bounded by ranges of mountains, leaving only narrow lowlands between them and the shores. No part of the whole peninsula is less than 2,000 feet above the level of the sea, and the average height of the most fertile tablelands is from 3,000 to 4,000 feet."

With reference to the vilayet, or province, of Angora, the same writer says: "The peculiar domain of the Angora goat, even the very center of it—39° 20′ and 40° 30′ north latitude and between 33° 20′ and 35° longitude east of Paris—is more or less mountainous and furrowed by deep valleys. Elevated masses are generally shaded by fine forests, while the plateaus, which form a large part of the country, are but sparsely wooded. On account of this nudity the early spring heat dries up what humidity is left in the earth. The climate, as should be expected under such circumstances, has extremes—winters very cold and summers excessively hot—the thermometer frequently descending to 5° to 10° F. below zero and rising as high as 90° F."

One more quotation will be of interest as showing something of the diversity of climate and soil of Angora and their influence upon the quality of the mohair. No such distinction due to climate and soil can yet be made concerning localities in the United States, but this may be owing to the fact that since mohair has been receiving particular attention it has not been grown a sufficient number of years in any one section to give it a distinctive

character; the animals have recently had rapid change of ownership, and some have spent much time on the railroad. The following information is from Gavin Gatheral, many years British vice consul at Angora, and a man who seized every opportunity to inform himself concerning the Angora goat in his native habitat.

"The most northerly point at which the mohair goat thrives is Kastamboul—a large and fertile province, but too near the moist winds of the Black Sea for the mohair goat to reach its highest development. The fleece, though lustrous, is harsh and coarse. It is somewhat unfortunate that the first selections for export to the Cape Colony for naturalization there, were made from this district. Had other varieties to be noted further on been preferred, the result of the Cape Experiment might have been more satisfactory.

"Two hundred miles inland, and to the southward, lies Angora. This province produces five different varieties from as many districts. Yaban-Ova is a heavy lustrous fleece; Chorba, a mohair so soft and fine that it falls to pieces as soon as it is shorn from the goat's back; Chubouk-Ova is remarkable for its length and fineness of fiber; Ayash is a white but lusterless fleece. The rams of these first-named districts are undoubtedly thoroughbred, though smaller in size than those of some other varieties. They possess all the points that a practical stock breeder will commend.

"Sheltered by oak forests during the short but severe winters, and grazed on the valley grass during spring and summer, they seem to find in the alteration everything needful for strength and vigor, as is proved by their being so prolific, the ewes having frequently pairs and often triplets. Joevas is bright and showy, but full of what is technically known as stick, or kempy, hair.

"Bei Bazar is so near Angora that the mohair it produces has no marked points of difference. The rams are larger in size, very hardy, and stand a sea voyage well. A few have been recently (1880) exported to the Cape Colony, the result being highly satisfactory. To the northward are Cherkass and Geredeh, two districts where the mohair goats have been introduced in comparatively recent times. There they develop distinct characteristics, owing to the difference of climate and elevation. The Geredeh ram is a large and powerful animal, covered with a fleece that seems almost black, surcharged with grease, but when scoured the mohair is found to be second to none in quality and quantity.

"The difficulty of access to this mountain region has hitherto prevented securing any of the goats for export. To the eastward are Sivrihisar and Eskishihan. Both suffered severely from the

two years of excessive drought in 1874-75, and the consequent famine. Many of the goats perished; but the grazers replaced them with stock from other districts, the result being a marked improvement in quality and value.

ANGORAS NEAR SKARIA RIVER, ASIA MINOR.

ANGORAS FEEDING ON SAGE BRUSH IN ASIA MINOR.

"On the south lies Konieh, the soil there being of the color and character of brickdust. The fleece of the Konieh goat is a reddish brown and, though this reduces the value of the mohair, it is sought after for special manufactures. Climate, soil, or food

cannot affect the products of high-grade mohair, provided two very essential points are carefully observed, namely, purity of blood and avoidance of humidity."

It was in this country that this famous goat reached its perfection—and such a perfection as has not yet been reached by the goats of either Cape Colony or the United States; indeed, the Turks themselves, by their shortsighted policy of extensive cross-breeding, have failed to maintain the high standard once held by their animals. That the altitude, the soil, or the climate, or all of them together possibly, had much influence in producing this fleece-bearing goat is supported by strong evidence, although there are some writers of note who claim that the character of the soil

PACK TRAIN ON SKARIA RIVER. ASIA MINOR.

exerts no distinctive influence. Dr. John Bachman, a well-known naturalist of this country and the Encyclopædia Britannica both state that the fineness of the hair of the Angora goat may perhaps be ascribed to some peculiarity in the atmosphere, "for it is remarkable that the cats, dogs, sheep, and other animals of the country are to a certain extent affected in the same way as the goats." The same opinion was expressed by Captain Conolly, quoted by Southey (1848): "It is remarkable that wherever these goats exist the cats and greyhounds have long, silky hair also—the cats all over their bodies, the greyhounds chiefly on their ears and tails." These statements lead Schreiner to the conclusion that the atmosphere is the chief factor. He says: "At any rate, there seems to be no doubt that a limited and comparatively well-defined region around the town of Angora possesses in a degree unapproached elsewhere in Asia Minor, and probably in the world,

those conditions favorable to the development of the soft, silky, lustrous white mohair goat." Too much credit must not be given to the atmosphere of Angora in the production of mohair. That it has a marked influence on animals anywhere is generally accepted. The experience of the Angora goat breeders of the Cape Colony and the United States shows that, with the best animals, a fleece equal to any produced by Turkey may be obtained. Indeed, it should be gratifying to the mohair growers to know that, while their mohair product of three years ago was very poor and that from twenty-five to fifty years ago it was sold with difficulty on account of its quality, the product now put upon the market is excellent and that of 1902 was superior, as a whole, to any that had been grown previously. George G. Emery, who is the leading mohair expert in the United States, made the statement at the third annual (1902) meeting of the American Angora Goat Breeders' Association that he had seen some domestic fleeces that were in every way equal to the best Turkish. He also exhibited two pieces of plush—one from domestic hair and one from Turkish—which were so nearly alike that no one could distinguish between them without reference to a private mark. Our breeders are striving strenuously and intelligently toward a better quality of mohair, and, in order to bring about this matter, they are eliminating so far as possible the common goat blood. Turkey, indeed, greatly injured her fleeces by crossbreeding, but until quite recently our own practice of the same error led us to further extremes than Turkey went. Again, the breeders of our country have learned that the feed of the animal has a pronounced influence upon the quality of the mohair in the same way that it has an influence upon the meat. The matter of better mohair is discussed quite fully in the chapter on "Mohair and mohair manufactures."

Crossing Upon the Kurd Goat in Angora.

Mr. Henry O. Binns, who had about twenty years of experience with these goats in the vilayet of Angora, says the pure animals were about bred out in 1863. The reason for this was the extensive crossing with the common Kurd goat, reference to which has already been made. As early as 1839 there ceased to be a demand for the spun yarn of Asia Minor, owing to the fact that Europe could spin yarn at much less cost; but there was a European demand for the raw hair which exceeded the supply. This condition of things led to complications and a mixture of breeds from which the mohair world has not yet recovered. There can hardly remain a doubt, however, that, with the recent renewed interest in the industry, and with the intelligence that the breeders will bring to

bear, the Angora goat industry will soon be placed on the highest plane.

The Angora Goat in the United States.

To write a history of the Angora goat in the United States is not a prodigious task, but it is a delicate one. The average newspaper correspondent of fifty years ago was no more careful of exact facts than he is now, and it is unfortunate that the historian of the Angora goat industry is largely dependent upon that kind of literature for his raw material. However, their introduction into this country was not so long ago that we are wholly dependent upon newspaper articles by unknown men, but there are those still living who have known the industry from the first day of its inception. Upon these men and upon the articles published by them and by Col. Richard Peters, the present writer depends for his information.

During the Administration of President Polk, the Sultan of Turkey requested of him that he recommend some one who would experiment in the culture of cotton in Turkey. Accordingly Dr. James B. Davis, of Columbia, S. C., was recommended, and he received the appointment. The work done by Doctor Davis appeared to be highly gratifying to the Sultan, and so, upon his return, in 1849, the Sultan, desiring to reciprocate the courtesy of the President, presented him with nine of the choicest goats in his domain.

These goats were imported as Cashmeres and were so regarded until after they passed to the ownership of Colonel Peters. Doctor Davis thought they were the goats which produced the fleece from which the famous and very costly Paisley shawls were made; and it is true that one of the number was a Tibet goat, which, in other words, means Cashmere, and was the breed producing the Paisley shawl fleece. As late as 1861 they were regarded as Cashmeres, for the records show that in that year William M. Landrum, who has been breeding Angoras longer than any other living man in this country, was awarded a silver goblet and $25 in cash for the introduction of the first Cashmeres (Angoras) into California.

To the casual observer, the Cashmere and Angora were very much alike—indeed, may have appeared to be the same animal—but the essential points of the animals are so different that it is a matter of wonderment how they could be regarded as being one species under two names. These differences will appear in the chapter devoted to a description of the Angora goat. At the present time it is everywhere acknowledged that the goats imported by Doctor Davis and known as Cashmeres were Angoras, and that the

Tibet goat which he imported was a true Cashmere. That Doctor Davis really thought his goats were Cashmeres, no one will doubt for a moment, and at that time nearly everybody else who pretended to know anything about goats agreed with him. It was subsequent scientific investigation that finally adjusted the error. The situation as it existed when these goats were introduced, if considered in connection with the situation as it exists to-day, does not justify a very few writers who hold to the idea that the goats originally imported were Cashmeres, and that subsequent methods of breeding here have transformed them into Angoras.

The first (or Davis) importation of Angoras was frequently exhibited at fairs, and always attracted much attention. The reports made by the officials of fair associations were always favorable, sometimes flattering, and as is known after years of experience, not always correct. The United States Agricultural Society which held an exhibition in Philadelphia, in 1856, awarded to Col. Richard Peters, who was then the owner of the Davis goats, $100 as a special reward. The following report was made upon the animals: "They have become known as Cashmere goats from the pure white color and fineness of their fleeces, and their undoubted Eastern origin. The fleeces from the bucks weigh 6 to 7 pounds, those from the ewes from 3 to 4 pounds. The flesh of the crosses is superior to most mutton, tender and delicious, making them a desirable acquisition to our food-producing animals.

"The ease with which they are kept, living as they do on weeds, briers, browse, and other coarse herbage, fits them for many portions of our country, where sheep can not be sustained to advantage, while their ability and disposition to defend themselves against dogs evidence a value peculiar to this race. They are free from all diseases to which sheep are liable, hardy and prolific, and experience has proven that they readily adapt themselves to all portions of the United States. The bucks breed readily with the common goats, the second cross yielding a fleece of practical utility, whilst the fourth is but little inferior to that of the pure breed.

"A flock of valuable wool-bearing goats can be raised in a few years by using grade bucks."

The following extract is from a report of the special committee appointed by the American Institute at its exhibition in New York City in 1855. The report was signed by B. J. Johnson, Charles J. Goodrich, and James J. Mapes: "They have examined with much interest the fleece submitted to them, and as well from their own observations as from the results of a microscopic examination made and certified to by several gentlemen of scientific eminence well known to them, they are convinced that the fiber of

ANGORA BUCK. Davis importation, 1849.

these fleeces is identical in character, and fully equal in value, to that from which the highly prized Cashmere shawls were made. The fleeces on exhibition, and now under examination, amount to from 4 to 8 pounds each.

"The enterprise exhibited by the introduction of these animals into this country and their propagation can not be too highly regarded.

"First. These animals are long lived, such being the case with the whole goat race.

"Second. They are prolific, breeding at the age of one year, with a period of gestation of about five months, and yielding twins almost universally after the first birth.

"Third. They are hardy, experience having shown that they will thrive well in our climate from Georgia to New England, and that they require coarse and cheap food—as the inferior grasses, briers, bushes, etc.—such as is refused by other grazing animals.

"Fourth. They produce a fleece of from 4 to 8 pounds, valued at from $6 to $8 per pound in France, or Paisley, Scotland, for the manufacture of those high-priced shawls. These fleeces can be produced when the animals become numerous at a less cost than the common sheep's wool and are superior to it.

"Another fact of great practical value to our agricultural interests is the facility with which the Cashmere goats breed with the common goats of our country.

"From these and other considerations, of the correctness of which your committee have entire confidence, it will be obvious that every encouragement should be shown this new enterprise—a bold and judicious movement."

A committee composed of James Renwick, Joseph R. Chilton, and W. H. Ellet submitted the following report to the New York State fair, held in New York City in 1854: "The undersigned can not avoid the conclusion that in the goats imported, and whose descendants have been the subjects of this examination, we have the first known specimens of that valuable race of animals from whose hairy fleece the celebrated shawls are manufactured, known in commerce by the inappropriate name of 'red camel's hair.' As the fleece does not appear to have deteriorated in the comparatively warm climate of South Carolina, the distinctive character of the race is hard to be obliterated, while in the northern region of the United States this character can not well fail to be permanent. Viewed in this light, the introduction of this animal promises to be of more value to the agriculture of the United States than that of almost any other animal."

Many other similar reports were made by committees of fair

ANGORA DOE. Davis importation, 1849.

associations about this time, and they show how favorably the new industry was regarded. However, the conclusion can not be avoided that the highly exaggerated statements appearing in these reports added to the enthusiasm of the time. It is possible that a few fleeces sold at $8 per pound, but in a search for authority it is learned that one man quoted another and one newspaper quoted another, and so on, but the purchaser was never located. At one time this matter was in warm discussion in the agricultural press, and correspondents demanded to know who sold the fleece and who bought it, but their inquiries appear not to have been answered. The most definite statement possibly that can be made regarding this matter is by Mrs. Harriet E. Davis White, a daughter of Doctor Davis. She says: "The fleece of the Davis Cashmere goat was very fine, and some of it was sold to parties in Paisley for manufacturing their famous shawls; and a Germantown company also bought some of the fleece and it brought $6 to $8 per pound. So the records state truly, though some have tried to dispute this fact. Owing to the lack of proper machinery, I presume, the fleece did not find a ready sale for several years. I saw some of the first fleece ever dyed and sent to Paisley."

It will be observed that Mrs. White refers in this quotation to the "Davis Cashmere goat," which has already been mentioned as among the original importation. No one can doubt the accuracy of her statement, because the marketable fiber of the Cashmere goat—the pashm—is exceedingly fine, only three or four ounces being the yield per goat, and the shawls made of it frequently sold for $1,500 each; and it is easy to believe that this hair, which was worth $2 per pound in the most inaccessible portions of Thibet, and having a number of additional charges put upon it as it gravitated toward the manufacturing mills, would bring the amounts mentioned by Mrs. White. As there was at the time much confusion as to the exact breed of the goats, there was the same confusion regarding the fleece and the prices. There were then no mills in the country to fabricate the fleece, and not enough was produced for export to establish a standard.

With reference to the fleece of the Angora goat, the following is taken from the Country Gentleman of January 9, 1868: "The conductors of that excellent Journal, the Boston Advertiser, addressed Mr. Geo. W. Bond, the leading dealer in such material at Boston, for information, and in reply Mr. Bond expresses the opinion that if the Cashmere, or Angora, hair 'could be obtained here in sufficient quantities to warrant the starting of machinery suitable to its manufacture and could be offered at about $1 per pound, a steady and permanent demand for it would be created.'

He says, however, that it is consumed by less than a dozen houses in Europe, and that, in fact, one firm consumes about one-third of the whole supply, and has agents in Turkey purchasing the same. Nearly the whole supply comes from Asia Minor, whence the exports for the past three years have averaged about 4,000,000 pounds per annum. An inferior quality comes from South Africa. As to its value here, he adds: 'Of the specimens raised in this country which I have seen, some fleeces have been very handsome, but there has been a great want of uniformity in the various lots —some fleeces being very poor and kempy, probably being crosses on the common goat, while others were as handsome as any that I have ever seen from any quarter. The value in England has, I believe, at no time exceeded 4s., or $1, per pound, unless it may have been for some exceptional parcels of great beauty and desired for some fancy manufacture in small quantities. The highest quotations in England to-day are 2s. 7d., or 62 cents, for the choicest quality down to 2s., or 48 cents, for good. * * * I doubt whether there ever was a time when 1,000 pounds of it could have been sold here for $1 in gold per pound; but a short time since, when fringes and tassels made of it became so fashionable, it is possible that a few of the choicest and most beautiful fleeces might have been sold at $4 and $6 per pound.' "

A tabular statement of prices of mohair in England may be found in the chapter devoted to prices.

Doctor Davis remained in the goat business but a few years, and his flock was disposed of to various persons. The world will probably never know just who all the parties were that secured them. An error has heretofore been made in writings of several persons—the present author among the number—in stating that the Davis flock of "purebreds" was purchased by Colonel Peters. But information recently coming to light corrects this error to some extent. A. O. Osborn, of Waterville, N. Y., published an article in the Country Gentleman of January 21, 1864, from which the following is extracted: "In the fall of 1854, Dr. D. C. Ambler, Col. William Osborn, and myself purchased of James B. Davis, Esq., of Columbia, S. C., three 'Cashmere goats'—one yearling buck, one yearling ewe, full blood, and one yearling half-breed—with the view of breeding for profit."

Colonel Peters published an article in the American Agriculturist for November, 1876, in which he said: "In the year 1854 I visited the farm of Doctor Davis, near Columbia, S. C., and found his stock of purebreds to consist of seven females and two males. Besides these he had one purebred Tibet ewe, several head of one-half Tibet and one-half Angora, and quite a number of

grade females bred from the common short-haired ewes of the country and his Angora buck. I purchased all of the purebred Angoras and several of the Tibet-Angoras." What Colonel Peters has said can hardly be doubted, although the following statement to the author by Mrs. Harriet E. Davis White apparently disputes its accuracy: "Doctor Davis had bred the Cashmeres with the common goats and had a fine flock of graded goats when Colonel Peters visited him to purchase goats from him. They discussed the value of the fleece and Colonel Summer said it would prove equal to the 'golden fleece' in a commercial way, in time. All of the purebred goats were not sold to Colonel Peters. Doctor Davis retained an interest which he did not dispose of to Colonel Peters until Doctor Davis's health began to fail; and Col. A. G. Summer also held an interest in them. Goats had been sold to other men before this sale to Colonel Peters. The original contract between Richard Peters, A. G. Summer, and Jas. B. Davis is still in the possession of his daughter" (Mrs. White).

The contradictions which stand out in the three quotations above are probably apparent only. It is easy to believe that the goats referred to by Mr. Osborn were purchased before Colonel Peters purchased any and are probably the ones referred to by Mrs. White as having been sold before the purchase by Colonel Peters.

We have a statement of record that one was purchased by Colonel Davenport, who lived near Harpers Ferry, and another by Col. Wade Hampton, of South Carolina. A. O. Osborn, in the same article from which he is quoted above, refers to his venture into the industry in this way: "In October I left home for Australia. Doctor Ambler, in the meantime and before winter, found a place for the ewes with a few owned by Colonel Davenport, near Harpers Ferry, Va., and thither they were sent. They remained with Colonel Davenport's flock until 1859, when they and their increase were exchanged with Richard Peters, Esq., of Atlanta, Ga., who had purchased most of Doctor Davis's flock, for Brahmin cattle."

One fact stands out prominently in the early history of the Angora goat industry in this country, namely, that previous to the outbreak of the Rebellion practically all of the Angora goats had passed to the ownership of Col. Richard Peters, of Atlanta, Ga. He took great interest in the little animal and its possibilities and is generally looked upon as the real founder of the industry in the United States. When we reflect that there was no real Angora goat industry in this country until within the last three years, we must reckon with others as well as Colonel Peters. Credit must first be given to Doctor Davis for his public spiritedness; and

whether his goats came from Persia, as he believed, or from Angora, there can be no doubt that they were the equal of any that ever came to this country, with many evidences of superiority. Full credit is due to Colonel Peters, who gathered together the remnants of the Davis flock and distributed their progeny over a large area of our country, and preserved a nucleus of the flock when the industry appeared to result elsewhere in failure. The outbreak of the Rebellion played havoc with the industry, with the final result that the flocks in the Eastern and Southern sections of our country were annihilated, with the exception of a very few in isolated localities. Some goats, however, had previously been sent into California, and from that State had spread back into Texas, New Mexico, and Arizona, and north into Oregon. The Western men who adopted the industry and finally saved it to the country were William M. Landrum, C. P. Bailey, and John S. Harris. It is no less gratifying to these men than it is to the thousands of goat breeders now in the United States, who delight in honoring them, that they still live to see the work of their earlier years now being crowned with abundant success.

Thus we have had three stages in the establishment of the Angora goat industry. Each of them has been all-important in its day, and all credit can not, therefore, be given to any one man.

Previous to the outbreak of the Rebellion, there were many fair-sized flocks in the South and Southwest. There were smaller flocks in many of the Northern and Western States. Dr. Diehl, in 1863, mentions flocks containing from 300 to 1,200 and more in Atlanta, Ga.; Gallatin and Nashville, Tenn.; Russellville, Frankfort, Paris, and Georgetown, Ky.; Greenville, Lebanon, Montgomery, and Bucyrus, Ohio; Green County, Ind.; Chicago, Decatur, and Evanston, Ill.; St. Louis, Maramee, and Fayette, Mo.; Baltimore, Md.; Leavenworth, Kans.; Brownsville, Pittsburg, Washington, and Philadelphia, Pa.; New York City, N. Y.; Boston and Belmont, Mass.; Austin, Tex.; and in the States of Iowa, Michigan, Minnesota, California, and in other localities. Soon after the close of the war they spread out into the West, principally into Texas and California, where the natural conditions were most favorable and where they have, quite unknown to the public, increased wonderfully in numbers and, in the light of recent events, in importance also.

In the spring of 1864 Colonel Peters sold two 16-months-old bucks to William M. Landrum, of San Joaquin County, Cal. They were sent from Atlanta to St. Louis by express; thence by steamer to Fort Leavenworth, and thence on foot to California with a wagon train. They subsisted on the journey by browsing on what

other animals rejected, and arrived at their destination uninjured and in good condition. Mr. Landrum exhibited them at the State fair the same year, being awarded a silver goblet and $25 in cash. One of the goats, after siring about thirty kids, died of snake bite; the other one, famous on the Pacific coast under the name of "Billy Atlanta," lived to be ten years old, and then was accidentally killed. He had sired about two thousand kids. This buck won the sweepstakes prize over all competitors at every State fair down to his death; and Colonel Peters stated in 1876 that his numerous descendants were scattered all along the Pacific coast, and that "his blood courses in the veins of over one-half the Angora flocks in that part of the Union, estimated to approximate 70,000." Colonel Peters further stated "that about one-third of the pure-breds introduced into California were contributed from the first and original (Davis) importations of 1849, and that their blood is present in probably two-thirds or three-fourths of the Angora stock on the Pacific coast."

Mr. Landrum was in California from 1850 to 1883, after which time he went to Texas. He is now at Laguna, Tex.

There have been from time to time various other importations of Angoras from Turkey and South Africa, which will be discussed in a chapter to follow. These were widely disseminated and the blood of most of them has been exceedingly beneficial to the industry in this country.

During the last two or three years a wonderful interest has been manifested in the Angora goat. The one great factor which brought this about was the information which was published and widely disseminated by the Bureau of Animal Industry. The large flocks of the West and Southwest have been divided up and distributed throughout the country. They may now be found in every State and Territory, including Alaska, and a few head are in Porto Rico. A considerable number are in Canada, where they are thriving well. Five years ago very few people, comparatively, had ever seen a goat of this breed, but now the Angora is a familiar sight in hundreds of localities.

There are three principal reasons for the present interest in the industry, which are as follows: (1) They are very effective brushwood destroyers; (2) they are mohair producers; (3) they yield a carcass that is palatable and highly nutritious. There is a chapter devoted in this work to each of these phases of the industry, and therefore further discussion will not be entered upon here.

A history of the goats themselves is not a complete history of the industry. One of the reasons why the industry did not become

a brilliant success from the first was because there was in this country no mills for fabricating the fleece which was produced, and the fleeces that were produced were not good enough for exporting. Goat raisers began to reap profits when mills were established here, and therefore the mohair manufacturer and the Angora goat raiser have conjointly established a great industry which is destined to fill a large place in the live stock industry of the United States.

CHAPTER II.

DESCRIPTION OF THE ANGORA GOAT.

Purebreds Ruined by Crossing with Kurd Goat.

Before proceeding with a description of the Angora goat, it is well to advert to a bit of history in connection with the mohair industry of Asia Minor. In 1867, when Israel S. Diehl, bearing a commission from the United States Commissioner of Agriculture, visited the province of Angora, he found but a few hundred looms working up mohair fleeces where once there were from 1,700 to 1,800 in operation. These few were struggling hopelessly against the fatal competition of European machinery and the aggressive policy of the European governments. The fleeces were exported to Europe for fabrication, thus rendering Turkey tributary to the monopoly then existing in this industry in Europe. The European demand for the raw material was so great and the facilities for fabricating it so much better and cheaper, that Turkey was compelled by the laws of trade to export the raw mohair. This is an instance where the prosperity of an industry almost proved to be its ruin, as we shall see. In order to meet this great European demand for raw material, the Turkish mohair growers, without wise foresight, began the practice of crossing the Angora upon the Kurd goat of that country. The inevitable result of such a practice was the adulteration of the blood of every Angora in Asia Minor so far as anyone knows or can judge by investigation at this time.

Description of a Purebred Angora Goat.

This ruinous practice has left the world without a purebred Angora goat apparently. There does not even appear to be a record anywhere of a description of a purebred animal, except the very brief one of Henry O. Binns, who spent twenty years in the mohair districts of Asia Minor between 1864 and 1886, and copied herewith: "The pure Angora in his prime is about the size of a five-months-old Cape (Cape of Good Hope) kid, with small thin horns, wooled all over the body, the hair almost covering the eyes; exceedingly delicate, and so subject to disease that no one cared to keep him. What is to-day called the purebred Angora is like the

English thoroughbred horse—the result of crossing and recrossing until body, class, points, etc., have attained to what is generally considered that the thoroughbred Angora ought to be."

Schreiner's opinion of what a purebred Angora was, is as follows: "I think it is certain that the original purebred white mohair goat was a small, very refined, delicate animal, of great beauty, clipping at twelve-months' growth of fleece, about from 2 to 4 pounds (according to age and sex—kids considerably less), of dazzling white, fine, soft, silky, very lustrous mohair, curling in ringlets from 10 to 18 inches long, with merely the minimum of oil in its fleece requisite to the growth of hair of the highest excellence, so small in amount as to be inappreciable to the unskilled observer. It was perfectly clothed in every part; it had short, silky, curly hair about the face and down the lower parts of the legs to the hoofs; a soft, silky, curly 'kuif' (tuft on the forehead), and small, thin, light-colored horns. The ewe was of course smaller and finer than the ram, and had only one kid at a birth (of this there is abundant evidence)."

Dr. John Bachman, a well-known naturalist, gives this brief description: "The Angora goat, more especially the varieties it has produced, is described by Hasselquist (1722-1752), Buffon (1707-1788), Pennant (1726-1798), and others as in general of a beautiful milk-white color, with short legs, and black, spreading spirally twisted horns. The hair on the whole body is disposed in long pendant spiral ringlets; its ears are pendulous, and the horns of the female, instead of divaricating as in the male, turn backward, and are much shorter in proportion."

Description of the Modern Angora Goat.

The facts stated in the above paragraph make it apparent that a description of the Angora goat of to-day would not necessarily apply to the purebred Angora of fifty or seventy-five years ago. As no effort has been made by an association or body of goat breeders to adopt a description of our ideal Angora goat, any description that may be made is largely a matter of the individual opinion of the one who makes it. However, there is singular unanimity among goat breeders as to what the best Angora should be.

The Angora goat is smaller than the ordinary common goat. It weighs from 60 to 100 pounds, although some are frequently found that weigh considerably more, especially if fat. The back should be straight, with shoulders and hips of equal height. A sloping rump is very objectionable. The chest should be broad, indicating good constitution, and the body round, legs short and

strong. The head should not droop, but be clean cut, with bright eye and broad muzzle; avoid a pinched nostril. The horns are grayish—never black; in the buck they are heavy, with an inward twist, inclining backward and to the outside. The doe's horns rise immediately upward and backward, slightly outward, with very little inclination to twist. In most animals the ears are pendant and from 6 to 8 inches long, with an average width of about 2 inches, and well pointed. In some animals the ears are fox-like—short, pointed, and pricked. There appears to be no other differences between the goats having the different kinds of ears.

The fleece of the animal should be pure white, although there are colored Angoras. No colored spots on the skin should be tolerated. The fleece should cover the entire body—as dense on the belly and neck as on the back and sides; should extend to the ears and jaw. While some are breeding for the topknot and for mohair on the face and lower legs, this is not an evidence that the animal is better than another that may not have the head and face covered. The mohair should grow to the length of about 10 inches during a year, and hang in tight ringlets or wavy curls. The curl should extend entirely up to the skin. "Slipey" mohair, or that which has lost its curl and is dry, fluffy, and with but little luster, is an indication of a poor goat or one in poor health. Poor feed tends to bring about such a condition in the fleece.

Are there Nonshedding Goats?

Yes; there are Angoras which do not shed—a very few; there are more which shed at regular intervals of 2 or 3 years. There is no evidence, however, that these animals are a distinct strain of the breed; the fact that they do not shed is probably due to local conditions, such as their health or their care.

Hornless Angoras.

There are a few hornless Angoras, but not many. They seem, like the nonshedders above, to be accidents rather than a distinctive type, or strain. Colonel Black says he has no doubt that the hornless goats are a "distinct breed." It is probably true that by proper selection in breeding a hornless type might be produced. Efforts in this direction are already being made with a flock in which Colonel Black is interested. Hornless Angoras, however, are not rare in Asia Minor.

Absence of Ill Odor.

A characteristic of the common goat that is very objectionable is the ever-present offensive odor from the bucks. In the Angora

"AZTEC," CHAMPION 1902 SHOW. Bred by D. C. Taylor & Son and sold to Kemble Bros., Muscatine, Iowa, for $1,400, the highest price ever paid for an American bred Angora.

breed, this odor is entirely wanting, except with the bucks at the rutting season, and then in a slight degree only. The odor of the mohair is milder than that of a wool fleece, and it is not at all offensive.

Description of the Cashmere Goat.

Although it has already been shown that the Angora is not the same breed as the Cashmere goat, it is well, since they were so long considered the same breed in this country, to describe the Cashmere.

The differences between these two breeds are so pronounced, especially in the matter of the fleece, that it is a matter of wonder that anyone ever considered them to be the same animal. The Angora has a long outward silky covering, with a second coat of shorter hair of different quality, and very sparse in quantity as compared with the longer covering, which is the mohair. The mohair, or outer covering, is the desirable part of the fleece, while the other part, technically known as kemp, is the undesirable and injurious part. The fleece weighs about 3 pounds, and is removed by means of shears in the same manner that sheep are sheared. The Cashmere also has two coats—the outer and longer and coarser, being of no economic use and therefore not sheared; the other is a very fine down-like substance called "pashm." The product of pashm per goat is from 3 to 4 ounces annually, and it is removed by combing. In the Vale of Cashmere and in Tibet, where many of these goats run wild, the natives gather the pashm from the twigs of bushes and points of rocks where the goats have rubbed it loose at shedding time.

The Angora sheds its entire fleece annually, while the Cashmere sheds its undercoat only. The value of the mohair ranges from 25 cents to 40 cents per pound. For pashm there appears to be no stable market, but it usually brings at the manufacturer's from $4 to $7 a pound. A writer in the Penny Magazine (London) in 1838 says: "The wool is first combed from the animal in the mountains of Tibet, where it is sold for nearly 5 shillings a pound. It is packed in baskets and sent to Cashmere where it pays a duty on entry. It is there bleached with rice flour, spun into threads, and taken to the bazaar, where another tax is paid upon it. The thread is then dyed, the shawl is woven, and the border sewed on." This is the material from which the famous Paisley shawls were made. Mohair was never used for this purpose except as an adulterant.

Mr. Diehl's description of the Cashmere follows: "This variety of the wool-bearing or shawl goat, as it is often called, is spread

over Tibet, Northern India, and the regions to the east of the Caspian Sea. It is somewhat smaller than the common and Angora goat. It has straight, round, pointed horns, pendant ears, is covered with straight and falling long, fine, flat, silky hair, with an undercoat in winter of a delicate greenish wool, of but 2 to 3 ounces each, which latter alone constitutes the fabric from which the celebrated shawls are made. Ten goats furnish only enough for a shawl 1½ yards square; but this is often found differing both in color and the quality of the wool, or rather the fine hair, of which the fleece is composed. The principal points in the most approved breeds are large ears, the limbs slender and cleanly formed, the horns not spirally twisted, and, above all, the fleece being long, straight, fleecy, and white."

CHAPTER III.

IMPORTERS AND IMPORTATIONS.

The Davis Importation.

Mention has already been made of the fact that the first importation of Angora goats into the United States was made by Dr. James B. Davis, of Columbia, S. C. These came to this country under the name of Cashmeres and they bore that name for several years afterward. The exact number of this importation is a matter of doubt, since Mrs. White, a daughter of Doctor Davis, states that there were ten of them. Col. Richard Peters says there were nine; Col. Wm. L. Black, author of "A New Industry" (Angora goat), says there were nine, but two were kids. Schreiner, in "The Angora Goat," says nine. Whether nine or ten, it makes little difference at this time except so far as it is desirable to make historical records accurate. Among the number which left Asia Minor was a Tibet buck and doe (true Cashmeres), but the buck died during the voyage. The doe was crossed with Angora bucks, but the progeny, according to the observation and experience of Colonel Peters, were unable to withstand the climate and all soon died.

All attempts to get goats out of the interior of Asia Minor have met with great difficulty. While Doctor Davis did not himself make the journey in search of those he brought home with him, his agent appears to have met with many obstacles. The Country Gentleman for 1856 contains an article by one Richard Allen, of Tennessee, from which the following is taken: "While there he [Doctor Davis] determined to procure the goat from its native wilds. The story of the journey would be too tedious for my brief letter, and I will merely add that, with an expensive outfit at Constantinople, a perilous journey of months, and the loss of many men and camels, he succeeded in capturing and carrying away eleven of the famous animals, whose fleeces, in the shape of shawls, are so highly prized and coveted by the ladies of all civilized nations and for which prices almost startling have been paid by the wealthy." In the light of later efforts to obtain goats from Asia Minor, we may easily believe the story recited above; in the light of history and later experience, however, it is now known that

the remarks concerning the value of the fleece did not apply to the animals which had been secured.

An account of how Doctor Davis obtained these animals, as furnished the author by Mrs. White, will prove interesting, and is as follows: "Doctor James B. Davis, hearing from Bishop Southgate, who had been in Persia as a missionary of the Episcopal church, of these silken-fleeced goats, realized their value and the importance of introducing them into his own country. He sent a trusty messenger to a native friend of Bishop Southgate, to whom a letter was written explaining the wish of Doctor Davis to obtain Cashmere goats of the purest blood; and, being familiar with the country and with the breed of goats that were desired, he purchased for Doctor Davis ten pure-blood Cashmere goats and one pair of Tibet shawl goats. Whether these were the genuine Cashmere, as Doctor Davis believed, or not, there has certainly never been any importation of goats made subsequent to this one that has equaled the Cashmeres purchased in Persia by this native Persian for Doctor Davis and by him imported into the United States. The messenger sent by Doctor Davis was absent several months, and the Doctor thought the effort to purchase these goats was a failure. Finally the messenger returned with the goats. These were brought to the model cotton farm furnished Doctor Davis by the Sultan of Turkey for experimenting in the raising of cotton in Turkey. The ten Cashmere goats lived, but one of the Tibet shawl goats died, and only the ewe goat was brought to the United States. The goats were brought down from the mountains to Dr. Davis on the farm near San Stefano on camels driven by the usual camel drivers."

The Chenery Importations.

Winthrop W. Chenery, of Belmont, near Boston, is generally credited with the second importation and also with the third. However, W. G. Hughes furnished Schreiner with information that in 1856 or 1857 the second importation was by Richard Peters and C. S. Brown, and the number of animals was "six or eight." Colonel Black[1] says of the Chenery importation, upon the authority of Wm. M. Landrum: "The second importation was made by Mr. W. W. Chenery, of Boston, Mass., about the year 1861, which consisted of twenty head, but they were affected with the Asiatic scab, and all died."

The following remarks on two importations, both by Chenery, were published in the latter part of 1862 in the Massachusetts

[1]A New Industry, p. 48.

Ploughman: "Two importations of these beautiful animals, purchased in Constantinople and consigned to planters in the South, have been landed upon the inhospitable shores of Massachusetts, where they still remain to illustrate, under the fostering care of one of our most experienced importers and breeders of stock, their capacity for acclimation in that latitude and their commercial value to the farmer and the manufacturer. The importations of the Angora, or Cashmere, goats to which we refer are at the Highland Stock Farm of Winthrop W. Chenery, of Belmont, near Boston.

"The first of the two lots, consisting of thirty-nine animals in Mr. Chenery's hands, was shipped at Constantinople on the 26th of March, 1861, and arrived at Boston on the 15th of May, except two animals which died on the passage. They remained in Boston until the 24th, during which time they were sheared, and were then taken to Mr. Chenery's farm. They were turned to pasture in the daytime and carefully housed at night.

"The second lot, consisting of forty-one head, left Constantinople on the 6th of October, 1861, in the same vessel, and arrived here on the 25th of November with the loss of only one upon the passage.

"In the whole flock, eighty in all, there were about a dozen males, and all the animals wintered well. The flock was increased by the addition of sixteen kids in the spring, but, in consequence of night exposure after shearing through the ignorance or carelessness of the man who had the care of them, the animals suffered much and twenty-four died."

Mr. Landrum is authority for the statement that Mr. Chenery made a further shipment of twenty head in 1866 and still another of twenty head in 1867; and that about thirty only of the forty arrived alive.

The Brewer Importation.

This was an importation of real Cashmeres rather than Angoras, or so-called Cashmeres, and is mentioned here only as an item interwoven with the early history of Angora importations. There were nine in the lot. They were purchased of a captain of a vessel from the Mediterranean. A previous arrangement was probably made with the captain of this vessel, as one George Trowbridge, a friend of Brewer, says that the latter gentleman imported them from Turkey. In 1859 Colonel Peters purchased out of this flock "a purebred male Tibet goat and three females having the appearance of being half Tibet, half Angora," as he himself states.

The Stiles Importation.

The Country Gentleman of 1860 gives a very brief account of the importation of eight Angoras, which at the time were said to be the first to arrive after the Davis importation. It is said that they had been brought about a thousand miles inland and shipped from Smyrna. The exact date of their arrival has not been fixed. No records have come to light giving any date, but the nearest is the notice in the Country Gentleman for January 29, 1860, which says "recently." Schreiner does not mention the importation, neither does Landrum, and Black, quoting from a letter by J. Washington Watts, who was for many years a goat breeder, and a personal friend of Doctor Davis, and who still lives, says they came "just before the war." Mr. Watts purchased a doe out of this importation. He said these goats were "larger and stouter than the Davis goats, but inferior in fleece."

The Diehl and Brown Importation.

An importation was made by Israel S. Diehl, who had been United States consul at Batavia, and Charles S. Brown, of Newark, N. J. It is difficult to fix the exact date of the coming of these goats, but it was probably during the year 1867. It could not have been later, for the Country Gentleman for December 12, 1867, says: "One hundred and sixty of these goats, purchased in Asiatic Turkey by Mr. Israel S. Diehl, recently arrived in this country, and have been placed on the farm of Mr. C. S. Brown, of Newark, N. J. Mr. Diehl was commissioned by the United States Agricultural Department last April to visit the Angora country and obtain all possible information regarding the goats, the best method of raising them, etc."

Mr. C. P. Bailey furnished the money for the transportation of these goats to California with the understanding that he should have the first choice at their sale. He says of them: "Some of these goats were fairly good and some were only ordinary. They were conceded to be the best imported up to that time. They were of medium size, and, with the exception of the neck, tolerably well covered with fleece, which, however, had a scattering of kemp throughout."

The Eutichides Importation.

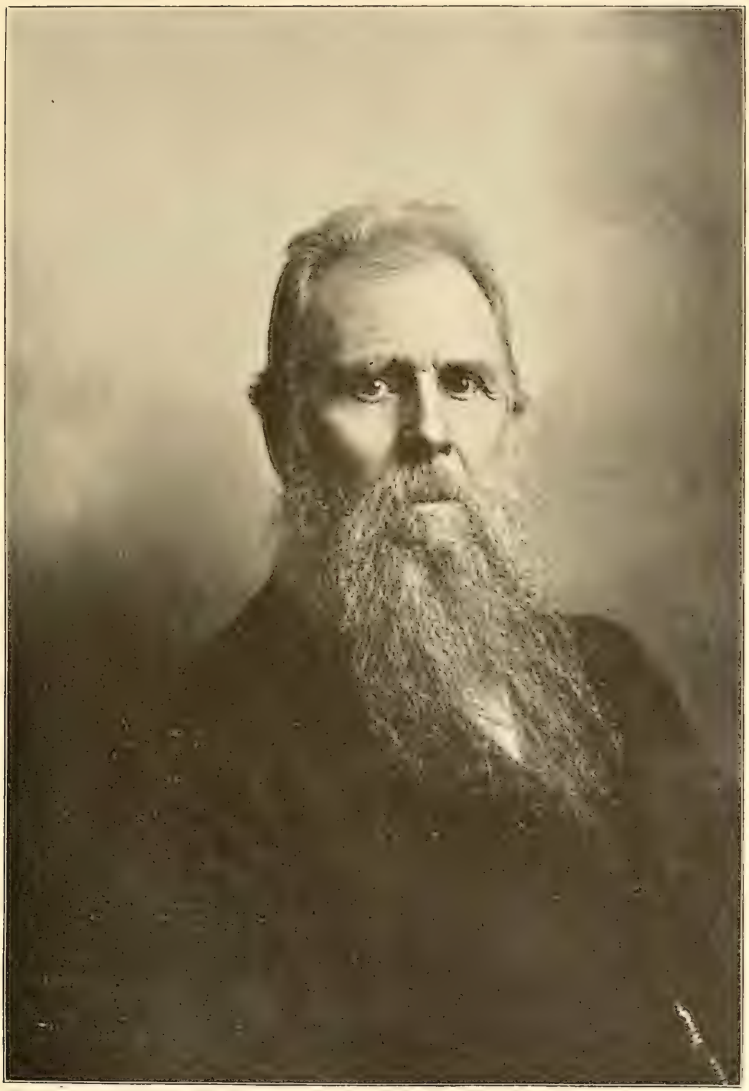
There is nothing at hand to show the exact date of arrival of this importation. Landrum says they came in 1871 and Schrenier says 1870. Landrum says "about one hundred were landed" out of two hundred shipped from Turkey. Schreiner says one hundred and seventy-five were shipped. The records all state that many

that were shipped died of Asiatic scab during the voyage and many others after their arrival here.

A. Eutichides was a native Turk, and the goats he imported were from his father's flock. The animals which survived the disease were poor grades and failed to bring the prices that he expected to get. Whatever the number may have been in this importation, there is evidence of record that they were kept for a time at Owings Mills, Md., near Baltimore. This statement appears in an article published in the Country Gentleman of February 4, 1875, signed by the initials "M. S. C." This writer says he purchased two of these goats, paying $125 each for them. He gives more of his experience, as follows: "Soon after I had purchased my pair of goats, Mr. Eutichides proposed that I should take his whole imported flock to keep on my farm on shares. We came to an agreement, and the whole flock numbering, I think, about one hundred and seventy-two head, was brought here [Rapidan Station, Va.] in midsummer, looking very badly." This movement was attended by all manner of misfortunes, which was probably due to the Asiatic scab already mentioned, and the correspondent requested Mr. Eutichides to take them away. This he did, taking them to a farm owned by himself in Appomattox, Va. Here they probably remained until their shipment to California, where they were sold at auction at disastrous prices. Eutichides became discouraged and soon after returned to Thessaly to engage in farming.

The Harris and Hall importation.

On April 16, 1875, John S. Harris, a jolly Scotchman who still lives to encourage the hundreds of beginners in the Angora goat industry, started from his home at Hollister, Cal., and traveled via Yokahama, Hongkong, Singapore, and Calcutta on his way to Tibet with the purpose in view of purchasing goats for his California farm. Landing in China, it was his purpose to proceed to Tibet overland. This, however, he found impracticable, and, going to Calcutta, he went through India to the Cashmere district to inspect the famous Cashmere goats of that country. The home of the Cashmere goat, he found, is in the Himalaya Mountains, 22,000 feet above the level of the sea, in a region of eternal snows. Knowing that these could not be profitably acclimatized in California, he concluded to go to Angora, in Asia Minor, but could not proceed overland on account of war, nor by the way of the Persian Gulf because of the unsettled state of the country. He therefore returned to Calcutta and went by way of Ceylon, Indian Ocean, Red Sea, and Suez Canal to Port Said, over the Taurus



JOHN S. HARRIS, SALEM, OREGON.

Mountains. He was twenty-one days in crossing these mountains, and suffered severely from intense cold, snows, etc., with no other food than black bread and a kind of molasses. Arriving in Angora, he purchased two bucks and ten does. With these he started for the coast. His precious goats were slung in boxes on donkeys, and mules were taken along to carry provender and baggage. He endeavored to reach Smyrna, but, after floundering in the mountains several days, he was compelled to return to Angora. Thence he turned north to Ismid, where he took a train for Constantinople. His next stop was at Liverpool, where the goats attracted much attention. They arrived at Baltimore on March 23, 1876. The goats were all yearlings, and they cost the importers $525 each, landed at Baltimore.

Mr. Harris was the second person from the United States to go into the interior of Asia Minor to purchase goats, Israel S. Diehl being the first. Few people have realized the difficulties and real dangers which Mr. Harris encountered, especially in India. He everywhere received the cordial support of the English officers there, but they all recognized the danger of his going into the valley of the Cashmere without a knowledge of the language. An illustration of this fact is shown in two out of several official letters which were written in his interest:

Lahore, Sept. 9, 1875.

My Dear Jenkins:

I give this to a very intelligent man, named John S. Harris, who has come all the way from California to get a dozen Cashmere buck goats to improve his stock in his former country.

Considering the man knowing nothing of the language, I think it shows he is a very sporting character to come so far on such a speculation and deserves every assistance.

The man is game to go into Cashmere to buy the goats himself, but he has only a month left before he must leave the valley again. I have advised him to go and see you, as I have no doubt you will admire the fellow's pluck and do all you can to help him, or if you send a man up to Jummoo, either with him or alone, you could get from the Maharajah's people the goats. He has money to pay. It is really a very enterprising thing and you are just the man to appreciate and encourage it, so I do not hesitate to ask you to help him.

Best regards. Yours sincerely,

M. Henry Nesbet.

[Postoffice illegible.]
Sept. 11, 1875.

My Dear Henderson:

I can not arrange better than by letting Mr. Harris go through by the Jummoo route. He seems a man who, from what Nesbet says, should be encouraged, and in this I agree; yet to let him go in by the Jummoo route, gritty as he is, without knowing a word of the language, would be madness.

I am rather surprised, to tell you the truth, at Nesbet sending him on ahead, as I could not get him passed on earlier by the Jummoo

route, as there will be a difficulty about supplies, etc. He has arrived here without a servant and there are [none] I could get here whom I could trust him with. He does not know a word of the language.

I have therefore recommended him to go in by Murree, where he will have a chance of getting a servant, etc.

For this purpose I give him this letter, open, so that ——— may read it and help him on with a letter to the Cashmere post. He tells me that he wants to go into Cashmere to get the goats himself, as he wants to see how they are kept, fed and cared for. I dare say I could get him the goats through the Jummoo people, but this does not seem to suit him. Please afford him every aid in your power, and oblige,

Yours sincerely,

C. JENKINS.

It is interesting to note in connection with this account that Mr. Harris was the first person to send a cable dispatch from Angora to the United States. He was given a receipt for the cost of the dispatch and it is now in his possession. On the back of the telegram, over the signature of the British Consular Agent at Angora, is a statement of the fact just mentioned.

The Peters, or Jenks, Importation.

This is another importation for which no definite date has been fixed. Landrum says they came in 1873, but this is probably an error of typography. Schreiner gives the year as 1879, which may be correct, but there is room for doubt. A daily paper of Boston, dated January 31, 1880, gives an account of the arrival of the goats on the steamer *Dorian,* from Constantinople direct. The evidence therefore is that they arrived about the latter part of January, 1880. They were imported by C. W. Jenks, of Boston, for Colonel Peters. The daily paper referred to says of them: "They were brought some hundreds of miles on mule back to the coast from the province of Geredeh, in the interior of Asia Minor. The Angoras heretofore received in this country have been from provinces near the coast, and are smaller, with fleeces of four, five and six pounds. The Geredeh breed is larger, with fleeces of eight, ten, twelve, and, in some cases, fifteen, pounds weight of mohair, very fine and silky."

The number in this lot was three. Colonel Peters did not hesitate to say that their mohair was inferior to that of the goats from Angora. It was an unsatisfactory importation.

Fink & Company Importation.

This was an importation of four animals—two bucks and two does—from Delagoa Bay. They arrived at New York on August 13, 1886, on the steamship *Lydian Monarch,* consigned to E. A. Shults, and were for Fink & Company, of Leon Springs, Tex.

They were the first goats to come to us from South Africa, and seem to have been a very poor lot. So little has been heard of them that many goat raisers have doubted that there ever was such an importation; but there are sufficient records to show that the goats arrived as stated above. Schreiner mentions the same shipment, and says that they came from the farm of J. B. Evans, of Graaff Reinet. He also says they were reported as being "a fine lot."

The C. P. Bailey & Sons Company Importation.

With the exception of Fink & Company, this firm is the only one that has imported goats from South Africa. In 1893 they purchased from R. Cawood, Ganna Hock, Cradock, South Africa, two bucks and placed them with their flock at San Jose, Cal. These animals were selected for points, and their blood has greatly benefited the Bailey stock.

In 1899 they imported another buck from South Africa. One of the points they particularly desired in this new buck was an increased amount of oil in the hair and he proved to have a very oily fleece—more oily than they would wish in their own flocks—but the offspring have, in their estimation, exactly the amount of oil desired.

The last importation of this firm, and the last one that has come from any foreign land, was in 1901. Willard C. Bailey personally visited every goat raising section of Asia Minor in the latter part of 1900 and the early months of 1901, and in Angora vilayet purchased four animals for export. Notwithstanding the decree of the Sultan of 1881 that no further export of Angora goats should be permitted, Dr. Bailey succeeded, by some sort of means, in getting out with four animals. He states that the Turkish government threw every possible inconvenience in his way, yet he carried with him an honorary commission from the United States Department of Agriculture. The goats duly arrived at the Bailey farm in California in good condition, after a long journey, and are pronounced excellent individuals.

Dr. Bailey's notes of his search for goats through Asia Minor—notes on the people, their customs and habits, their agriculture, their animals, etc.—are very interesting. With reference to his difficulty in getting the goats out of the country, he says: "A ride on mule back, then on camels; a trip in a closed carriage; then to be tightly packed in a sack and carried for miles on a man's back; next to be given a hay ride on the Bosphorous (under a boat load of loose hay); to be shorn in cold weather and run through coal dust, only to look the death ax in the face, but to be saved

DR. W. C BAILEY.

by the 'golden wand'; through the streets of the oriental capital in an open wagon, but looking more like dead animals than live ones; even now to be stopped three times by customs officials and the police, and as many times passed. They are out of the Ottoman Empire now, but they have yet a long and tiresome trip."

Dr. Bailey is one of the three men who have gone into the interior of Asia Minor for goats. His predecessors were Diehl and Harris. He is the only one who has ventured upon such an errand since the Sultan prohibited further exportations, which was in 1881.

The Landrum Importation.

On April 26, 1901, there arrived at New York two South African yearling bucks, for William M. Landrum, of Laguna, Tex., the veteran breeder of Angoras. They were seventy days on the journey to New York, and reached their new home on May 2. These two goats were bred in South Africa by R. C. Holmes, their sire being Dick, which was the prize buck at the Port Elizabeth show in 1900.

These goats have not yet been on exhibition, but some of their kids have been exhibited and were prize winners at the exhibit of the American Angora Goat Breeders' Association in 1902. They possessed most excellent qualities, and by seeing them one is almost ready to indorse what Mr. Landrum says, in the following words, of his imported bucks: "These are the most perfect goats I have ever seen, and I have seen all but a very few of all that have been imported to the United States. Those who thought that there are no first-class Angoras in South Africa have been mistaken. Pasha is a better goat than any that ever came to America from Turkey, and these are even more perfect than Pasha. Of the goats from Turkey, some have had one fine point and some another, but I have never seen a goat before with all the good points these have. The Davis goats had the finest fleece in the world, but it was confined to their sides. Their bellies and throats were naked, and they had coarse hair on their backs. Diehl had some good goats but none perfect. Chenery had four or five almost perfect does, but no bucks to equal them. A perfect animal in any breed is hard to get."

Concerning Future Importations.

The probabilities are that it will be many years before there are any further importations. The prohibitive decree of the Sultan of Turkey, issued in 1881, has already been mentioned, and there is nothing to justify a hope that it will be repealed. There are

SWEEPSTAKES DOE, 1902 SHOW, AND EIGHT MONTHS OLD DOE KID (sired by South African Dick). Raised and owned by F. O. Landrum, Laguna, Texas.

very few people who would take all the risks that Doctor Bailey took and there are fewer still who would succeed. South Africa has provided for an export tax of £100 on each Angora goat. Although this is not now in force, it may be made effective at any time when the goat raisers may desire it. Besides, the presence in South Africa of contagious diseases which affect goats, sheep, and cattle, has caused the Bureau of Animal Industry to quarantine against goats and other ruminants from that country. How long this situation will remain no one can tell.

CHAPTER IV.

NUMBER OF ANGORA GOATS AND PRODUCTION OF MOHAIR.

Number in the United States.

Previous to the year 1899 the very large majority of the Angora goats in the United States were located in Texas, New Mexico, Arizona, California, and Oregon; there were some States which probably did not have a dozen within their borders. At the present time, however, they may be found in every State and Territory. The increase in numbers has not been so great, but the spread over such a large territory in three years is little less than marvelous, and could have been brought about by nothing less than American energy.

The goat men were very desirous that the census of 1900 should show the number of Angoras in the United States, and the director of the census, recognizing the need of such statistics, directed that this work be done. As the report which is published does not differentiate between the breed, the public accepts the explanation that the failure rests with the enumerators. The statistics which the goat men desire—but which will probably not be forthcoming for several years—will give the number of Angoras and common goats, and the Angoras will be divided into the various crosses upon the common breed.

The number of goats of all breeds reported by the census of 1900 was 1,918,904, of which number 47,652 were in cities and villages. This number was so great as to cause surprise. No one had an idea that there were so many. They had not figured in the markets as meat; their skins were hardly mentioned as a product for our leather goods manufactures; any considerable numbers actually kept for milk were seldom heard of; and, although common goats will eat brushwood as readily as Angoras, their use for this purpose had never been noted. Yet it was the few Angoras only among these 2,000,000 goats which had made any impression upon the country. All of which leads one to suspect the accuracy of the census figures. However, the lack of information to the contrary compels us to accept these figures. The accompanying table, compiled from the census reports, shows the number and value of goats of all breeds in the several States and Territories,

and also the number of farms on which they were found. This table does not include those in cities and villages.

NUMBER AND VALUE OF GOATS, ALL BREEDS, ON FARMS IN THE UNITED STATES IN 1900.

State or Territory.	Number of farms reporting.	Number.	Value.
Alabama	8,633	117,413	$ 94,258
Arizona	436	98,403	167,863
Arkansas	4,571	51,839	58,788
California	1,579	109,021	262,981
Colorado	620	37,433	73,141
Connecticut	73	313	1,945
Delaware	43	143	519
District of Columbia	6	9	39
Florida	2,154	43,705	32,639
Georgia	6,716	84,624	61,972
Hawaii	19	653	731
Idaho	68	4,481	20,167
Illinois	1,642	8,877	19,932
Indiana	1,518	4,484	8,920
Indian Territory	733	10,529	21,538
Iowa	3,007	41,468	146,708
Kansas	995	18,288	71,290
Kentucky	2,144	11,967	19,753
Louisiana	2,723	38,308	35,697
Maine	70	279	1,091
Maryland	227	1,179	4,023
Massachusetts	145	1,254	7,188
Michigan	537	2,861	10,008
Minnesota	498	3,821	12,908
Mississippi	5,431	55,388	45,594
Missouri	2,754	24,487	64,786
Montana	61	1,713	7,870
Nebraska	488	2,399	9,126
Nevada	39	4,633	12,948
New Hampshire	61	208	916
New Jersey	200	699	3,006
New Mexico	2,874	224,136	472,961
New York	576	1,316	6,442
North Carolina	5,089	42,901	37,997
North Dakota	142	1,122	5,308
Ohio	1,025	5,432	16,975
Oklahoma	277	3,772	10,854
Oregon	2,178	109,961	375,229
Pennsylvania	763	2,197	8,951
Rhode Island	16	23	131
South Carolina	3,643	26,576	24,450
South Dakota	252	2,915	15,050
Tennessee	3,663	25,884	38,938
Texas	6,742	627,333	923,777
Utah	93	1,427	2,702
Vermont	41	102	444
Virginia	1,004	5,305	10,002
Washington	165	2,876	10,757
West Virginia	219	847	2,123
Wisconsin	534	3,882	12,760
Wyoming	47	2,666	11,884
Total	77,534	1,871,252	$3,266,080

It is, of course, impossible for anyone to know how many of these 2,000,000 goats are of the Angora breed. We may, however, be permitted to venture a little guessing. The census gives 961,363 pounds of mohair as the product of 1899. Now, if we consider everything as an Angora which produces mohair—from the first cross to the highest bred animal—the average production of mohair

FIRST PRIZE YEARLING BUCK, 1902 (half-brother to Champion Aztec).
Owned by the "Boy Breeder," Wm. J. Cohill, Hancock, Md.

per head would be not far from two pounds. This estimate may be too high. This means, then, that there were about 500,000 Angoras in 1899. At this time (autumn of 1902) the number of Angoras of all grades in the United States is not far from 700,000. It may be said, incidentally, that the number of thoroughbred or highbred Angoras is very much smaller.

Number in South Africa.

The number of Angora goats in Cape Colony in 1891, according to the census returns, was 3,184,018. W. Hammond Tooke has estimated the number for the years 1893 to 1898 to be as follows:

	Number.		Number.
1893	2,811,206	1896	2,546,981
1894	2,619,708	1897	2,685,080
1895	2,611,082	1898	2,982,811

Elsewhere it is shown that the average annual exportation of mohair from the Colony for the five years of 1896 to 1900. On the basis of 3,000,000 goats in 1900, an estimate warranted by Mr. Tooke's figures, this would show the average weight of the fleeces to be 3.75 pounds. This, of course, can not be correct. If we divide the 11,253,470 pounds of mohair exported in 1900 by 2, which is more likely the average weight of the fleece, we get 5,626,735. This must represent pretty nearly the number of Angoras in South Africa in 1900. The war which decimated the herds of live stock in that country had a blighting effect upon the goat industry, and it is very probable at this time that there are not 5,000,000 fleece bearing goats in that country.

Number in Turkey.

The number of Angoras in the vilayet of Angora, in Asia Minor, can not be given with any degree of approximate accuracy. There were 1,230,000 there in 1894, according to Schreiner. While the best goats are in this vilayet and a greater number are there than in any other, it is a fact that there are many Angoras in other parts of Asia Minor. It is well known that practically all of the mohair product is exported to Bradford, and the declared exports to that market show an annual average for the years 1896 to 1900 of 9,316,477 pounds. An English authority, who is thoroughly familiar with the Angora goat industry of Turkey, says the average weight of the fleeces is under 3 pounds. Let us suppose it to be 2½ pounds; this would indicate the number of goats to 3,726,000. This same English authority says the number of goats there has been stationary for the last twenty years. The testimony of others who are familiar with the industry there agrees with his. There

STUD BUCK "PRINCE OF L." and "OUR TWINS" (9 mos. old).
Owned by N. A. Gwin, Lawrence, Kan.

appears to be no further opportunity for expansion under the conditions and methods which now obtain and the Turk will be slow to change his methods or to accept new ideas.

Production of Mohair in the United States.

The census collected statistics on "mohair and goat hair" (all was probably mohair), and ascertained the quantity produced in 1899 to be 961,364 pounds. The Bureau of Animal Industry, however, in correspondence with some of the leading mills which handle mohair, found that the four largest consumers used 1,077,000 pounds in 1899. Three of them used 1,089,550 pounds in 1900, and 1,327,095 in 1901. It might be argued that the mills purchased mohair which had been held over in store from a previous year; but that hardly explains the increased production for three consecutive years, and leads one again to suspect the accuracy of the census figures. It must be remembered, also, that several mills which were not mentioned consumed a considerable quantity of mohair. So it is pretty safe to say that the production of American mohair was about 1,000,000 pounds in 1899, with a small annual increase for the years since that time.

The accompanying table compiled from census reports, shows for 1899 the quantity of mohair produced by States and Territories, the total value of the same, and the value per pound in each State. The average value per pound for the whole country was 27.8 cents.

QUANTITY AND VALUE OF MOHAIR AND GOAT HAIR PRODUCED IN 1899. FROM REPORTS OF THE TWELFTH CENSUS.

State.	Quantity.	Value.	Value per pound.
	Pounds.	Dollars.	Cents.
Alabama	469	140	29.8
Arizona	27,030	7,326	27.9
Arkansas	1,763	487	25.3
California	169,770	45,665	26.9
Colorado	1,843	550	29.8
Connecticut	465	177	38
Florida	20	8	40
Georgia	726	215	29.6
Idaho	11,688	3,989	34.1
Illinois	2,793	751	27
Indiana	867	282	32.5
Indian Territory	760	126	16.6
Iowa	28,080	8,607	30.6
Kansas	4,066	1,077	26.5
Kentucky	524	163	31
Louisiana	385	92	23.8
Maine	105	21	20
Massachusetts	1,120	396	35.3
Michigan	1,833	419	22.8
Minnesota	556	180	32.3
Mississippi	268	84	31.7
Missouri	10,203	2,798	27.4
Montana	2,750	824	30
Nebraska	5,801	1,725	30
Nevada	10,590	3,672	35
New Hampshire	30	9	30
New Mexico	113,545	29,917	26.4
New York	383	155	40
North Carolina	416	97	23
North Dakota	1,220	448	36.7
Ohio	469	112	24
Oklahoma	693	187	26.7
Oregon	267,780	74,363	20.3
Pennsylvania	720	242	33.3
Rhode Island	10	2	20
South Carolina	73	26	35.6
South Dakota	1,693	683	40.3
Tennessee	1,486	438	29
Texas	274,810	77,478	28.2
Utah	459	142	31
Vermont	5	2	40
Virginia	343	113	33
Washington	4,000	1,097	27.4
West Virginia	140	43	30.7
Wisconsin	514	145	28.2
Wyoming	8,100	2,412	29.7
Total	961,364	$267,875	27.8

Foreign Mohair in Competition.

Returns to the Bureau of Animal Industry from the mills mentioned above show that they consumed 1,119,465 pounds of imported mohair in 1899, 369,475 pounds in 1900, and 183,137 pounds in 1901. The reduced quantity of the imported product was not due to the increased quantity of the domestic product, for that increase was but slight, but to the fact that mohair manufactures have not been "in fashion" for two or three years. Official reports show that we imported from Turkey, during the fiscal year of 1901, mohair to the value of $68,794.56.

Turkey is sending to England about 9,000,000 pounds of mo-

hair annually, and the Cape of Good Hope and other British possessions 11,253,470 pounds; but so long as we are importers and not seeking a foreign market, these do not enter into competition with us. The conditions of our own country are so well adapted to the Angora industry that the time is not far in the future when it is probable that we shall produce more than domestic consumption demands; then we shall attack the problem of foreign competition with every feaure in our favor.

Mohair Product of Turkey.

There are no exact statistics available on the mohair production of Turkey; but it is known that practically all of the product is exported and that it goes to Bradford, England. The reports of receipts of mohair in that market, therefore, will enable us to form an estimate of the Turkish production, and they are quoted herewith for a series of years, as given by Schreiner upon good authority:

	Pounds.		Pounds.
1875	5,321.000	1886	9,825,320
1876	4 420,000	1887	5,612.550
1877	5,984.000	1888	7.509,070
1878	4,641,000	1889	8,844.080
1879	5,831.000	1890	4,120,220
1880	8.245.000	1891	6.496.115
1881	4.221,780	1892	7.774,541
1882	9.065 250	1893	8,005,887
1883	7 256.960	1894	6,889,165
1884	9,019 860	1895	11,000,000
1885	6,373,640		

Year.	Pounds.	Value.
1896	4,829,410	$1,842.734
1897	10,701.390	3,611.931
1898	10,161,869	3.888,922
1899	12,351,342	4.392,367
1900	8,538,374	2,903,116

The returns for the years 1896 to 1900 are from reports of the Section of Foreign Markets of the Department of Agriculture, and are declared exports from Turkey to England.

The reason for the wide fluctuations between years, which are sometimes very great, can be explained only on the supposition that not all of the mohair product of one year was exported, but was held back and placed upon the market the next year. The product could not vary in quantity as the exports have done. The average annual exports for 1896 to 1900 was 9,316,477 pounds, with an average annual value for the same period of $3,327,814.

Mohair Product of Cape Colony.

With Cape Colony, as with Turkey, estimates of the production

BRED AND RAISED BY C. P. BAILEY & SONS, SAN JOSE, CAL.

of mohair must be based upon the exports; practically none of the product is consumed in the Colony.

Schreiner furnishes the official figures of exports of mohair from 1857 to 1898, and the same are quoted herewith:

	Pounds.		Pounds.
1857	870	1878	1,358,395
1858	...	1879	2,288,116
1859	502	1880	2,590,232
1860	385	1881	4,146,128
1861	784	1882	3,776,657
1862	1,036	1883	4,443,971
1863	1,354	1884	4,329,355
1864	8,104	1885	5,251,301
1865	6,992	1886	5,421,006
1866	21,165	1887	7,153,730
1867	50,832	1888	9,598,768
1868	102,570	1889	9,442,213
1869	260,932	1890	9,235,249
1870	403,153	1891	9,953,548
1871	536,292	1892	10,516,837
1872	876,861	1893	9,457,278
1873	765,719	1894	10,003,173
1874	1,036,570	1895	11,090,449
1875	1,147,453	1896	10,001,028
1876	1,323,039	1897	12,583,601
1877	1,433,774	1898	10,876,014

The Section of Foreign Markets of the Department of Agriculture has compiled statistics of exports for the years 1896 to 1900 showing the exports from British Possessions, including Cape of Good Hope, Madras, Bombay, Natal, and places of lesser importance, and the same are quoted herewith:

Year.	Pounds.	Value.
1896	10,024,399	$2,631,560
1897	12,058,490	3,088,130
1898	10,686,730	3,152,387
1899	14,060,404	4,155,986
1900	9,437,324	3,055,262

The average annual production for these five years was 11,253,470 pounds, with an annual average value of $3,216,665.

The Question of Overproduction.

The question of overproduction of mohair has already been raised, but the most careful scanning of future conditions fails to reveal such a situation. The fact must be kept in mind that the larger part of the domestic product is of inferior quality and, of course, brings a reduced price. The same is true of the South African product. The great demand now is for a quality suitable for plushes, and these cheaper grades do not answer the purpose; consequently the demand for the low grades is growing weaker and weaker. The result is that the mohair growers are doing all that energy and intelligence can accomplish to produce the best—the kind which the market demands now and shall always call for.

While we in this country are already doing wonders toward this desirable end, it will require many years to produce enough to supply domestic consumption. Therefore the coming of the day when we shall be producing a surplus of first quality of mohair is far in the future. In this connection it will be interesting to read an article from H. M. Williamson, editor of the Oregon Agriculturist and Rural Northwest (September, 1902), a gentleman who has had a grasp of the Angora goat situation in this country for many years:

"As to the probable growth in the use of mohair we can get some indications from what has already been done. The exports of mohair from Turkey increased from 1,247,000 pounds in 1839 to about 11,000,000 pounds in 1895. The exports from South Africa increased from 870 pounds in 1857 to over 11,000,000 pounds in 1895. In a period of fifty years ending with 1895 the world's supply of mohair increased from about 2,000,000 pounds to 22,000,000 pounds. The period of most rapid increase was from 1875 to 1895, when the combined exports from Turkey and South Africa rose from 6,468,453 pounds to a little over 22,000,000 pounds. Although there was a large increase in the exports of mohair from Turkey prior to 1875, there was no material change or reduction of prices. The lowest price for Turkish mohair at Bradford, England, between 1862 and 1876 was 2s. 4d. per pound, and the highest was 3s. 10d. In 1876 the price was 3s. 9d. The price then began to go down and went down pretty steadily until 1888, when the price of Turkish mohair in Bradford ranged from 12d. to 14d. per pound. The total supply of mohair that year was in excess of 17,000,000 pounds, as compared with less than 6,500,000 pounds thirteen years before. The rate of increase of production during that interval had been too rapid, apparently. Since 1888 the increase in the production of mohair has been at a much lower rate. It is not probable that the world's supply last year exceeded 25,000,000 pounds, or 8,000,000 pounds more than the supply in 1888, showing not merely a greatly reduced percentage of increase for the thirteen years as compared with the previous thirteen, but an actual falling off of increase from 10,500,000 pounds for the first period to 8,500,000 pounds for the second period. Prices during the past thirteen years have fluctuated materially, but the prices of Turkish mohair have never fallen below those of 1888 and for the past five years have been from 25 to 50 per cent higher than they were in that year. We may assume, therefore, that the rate of growth of increase in the use of mohair has been sufficient to take up fully the increase in production. This applies strictly, however, only to Turkish mohair. There has

been a serious falling off in the price of South African mohair in the past year or two, due to the fact that the demand is for finer fibered hair than most of that produced in South Africa. The production of mohair has grown comparatively slowly in South Africa since 1888. The mohair growers were, however, more prosperous than the wool growers until very recently. We lack knowledge upon which to base a guess as to the future increase of production there, but know of no reason which will operate to make the increase more rapid in the future than it has been since 1888. The United States is the only country in which the increase in the production of mohair is likely to be very rapid in the immediate future. The production in this country in 1900 was about the same as it was in South Africa in 1875. If production increases as fast in this country as it did in South Africa we shall be producing over 5,000,000 pounds in 1910. In view of the present volume of mohair produced in the world and the rate at which its use has been increasing, an increase of 4,000,000 pounds in the production in the United States in ten years should not disturb the market or injuriously affect prices. It is possible that the increase may be greater than 4,000,000 pounds. It would be possible to increase the production in ten years from 1,000,000 to 10,000,000 pounds. There is no probability of such an increase and it would not be desirable. To make such an increase would mean no improvement in the average quality of the mohair produced in this country.

"There is already too much low-grade mohair produced both in South Africa and the United States, but the conditions are not such as to warrant any fear of overproduction of mohair of fine quality for many years to come, nor is it likely that the prices of mohair equal in quality to Turkish will average lower than they have been during the past four or five years."

If a moment's thought is given to the many uses to which mohair is now put and to which it may be put in the future, it is difficult to conceive of a surplus at any time. It must not be forgotten that mohair has a field all its own in most respects, and it is a thrifty competitor in some other fields. Its beauty and durability will recommend it for a host of things which are now made of wool or other fiber. The pages devoted to mohair and mohair manufactures are full of reasons why there is not likely to be an overproduction. The most essential thing at this time is to have mohair divorced from the caprices of fashion and become a staple on the market as distinct as wool or cotton.

CALIFORNIA ANGORAS. Photo by J. W. Fulton.

CHAPTER V.

BROWSING AND PASTURAGE.

Goats Are Browsers by Nature.

Goats are browsers by nature, and there is no vegetation which they will eat in preference to the leaves and twigs of bushes. This fact establishes them at once as an intolerable nuisance in the orchard and the garden or any other place where desirable shrubbery may be growing, but it was this characteristic which commended them to the farmers of this country as destroyers of useless brushwood. They are omnivorous eaters of brushwood, briers, and weeds, but seem to be careful to avoid that character of vegetation which other kinds of live stock prefer. Every leaf and twig within their reach is greedily eaten, even to most of the bushes and weeds that are considered poisonous to other ruminants, while a remarkably few weeds are passed by. They will desert the finest clover and blue grass for such an outlay.

As Brushwood Exterminators.

A patch of brushwood which may be so dense that a man can not get through it will soon be converted into an open woodlot if Angoras are permitted to operate upon it. In this effort to get the leaves and twigs, they will stand on their hind feet and strip a sapling to a height of five or six feet. They will do more than that. With an instinct approaching human intelligence, a single animal will get astride a small sapling and ride it down and hold it there until it is completely stripped of leaves and twigs by as many goats as may be able to get at it. This will explain why so many saplings are seen which are stripped to a greater height than any goat could possibly reach. Oftentimes they will strip the bark from young trees. Their habits in this respect, however, are erratic. Sometimes they will run among the saplings for weeks without touching the bark of a single one, and then, as if for the very fun of the work, all will begin some morning to tear the bark off most vigorously.

A thousand men have wondered why the goat had not been used as a brush exterminator years and years ago, for his habits have been known since the days of Abraham and even before; but

he was not so employed, and when he was recently brought to the front as an economic factor he was hailed as a "modern discovery." The credit for the discovery of the goat as an economic factor in the matter of destroying brush is generally conceded to Dr. J. R. Standley, of Iowa. He read an article in a consular report concerning the value of milch goats in a foreign country, but the objection was made that they destroyed every tree and shrub with which they came in contact. Instantly the thought occurred to him that the characteristic which made the goat a nuisance abroad would make it beneficial on his large tract of land which was idle and useless because of its dense growth of underbrush. Acting upon the thought, he went into Texas and secured a carload of Angora goats and turned them onto his land, with the gratifying result, now duplicated in every State of the Union, that the brushwood had met a master. Upon his recommendation, based upon his experience, thousands of goats were taken into Iowa for clearing brush land some time before they were seriously considered elsewhere. Dr. Standley's opinion of goats as brush destroyers is given herewith: "Land can be cleared of the worst brush known to this country for a little less than nothing by Angora goats. Some one asks how. Simply this: Angora goats will pay a profit and live on leaves and weeds, leaving the land cleaner and nicer than can be done in any other way. Many persons have the idea that goats bark the trees and in that way kill them. They also think that goats wholly eat the hazel and other small brush. There is nothing in this. The way in which goats kill brush is by continually cropping the leaves, which serve as the lungs of the brush. The continued cropping of the leaves makes the brush, as it were, sick, caused by lack of nourishment. This sickness sinks to the very extremity of the roots, thus preventing sprouting. Any and all kinds of bushes are in this way easily killed. Some kinds of brush and some kinds of stumps are, of course, much harder to kill than others. Many varieties are entirely killed by one summer's trimming of the leaves. Almost any are killed by two years' trimming. To clear the worst brush do not cut anything that the goats can reach or bend. The tallest or largest is better not cut. All trees and saplings should be cut and the goats will keep all the sprouts down. If stumps are allowed to sprout one year before the goats are turned in, the sprouts need not be cut. About 200 goats for 40 acres of brush will in two or three years make the land as clean as a garden. If the pasture has only patches of brush, turn in a few goats and it will make more grass for other stock than if the goats were not in. They eat very little grass when they can get leaves. Goats even like weeds better

than grass. In clearing brush land in the old way by grub and plow there are always left many eyesores in the way of brushy nooks and bends and steep places which can not be plowed.

"There are millions of acres of land in nearly every State in the Union which might be much more than doubled in value by the use of Angora goats at no cost at all. Commence and count the worth of your land, then the fencing, and see if you can afford to leave your brush land so nearly worthless for all time. Then count the cost of grubbing and plowing, if indeed such land is susceptible to the plow. No man can afford to grub and plow brush land in this day and age of the world any more than he can afford to plant a large field of corn without a planter. In hilly or mountainous portions of the country the Angora goat can be made to do a great service in the way of clearing the underbrush, when the land will bring grass after the brush is gone. It would surely be a paying business to buy up large tracts of rough land in the mountain districts, or indeed any brush land in the United States, and clear the brush and set in grass. Afterwards, if the owner liked other stock better, he might dispense with the Angoras. In many places where the country is too bare to furnish sheep with sufficient feed goats will do exceedingly well. In many places where leaves are abundant and there is scarcely any grass making it impossible to profitably keep sheep, goats will do admirably."

The following testimony of Prof. C. D. Woods, director of the Maine Experiment Station, shows what the Angoras will do in that part of New England: "In May, 1902, six ewes, one buck, and five kids were put in an acre of young woodland of a mixed growth, most of the trees being three to six inches in diameter. There was a quite thick growth of underbrush. The small underbrush of birch, maple, hazel bush, etc., have been cleaned up so that where there are no alders or evergreens the ground under the trees is as clean as though it had been burned over. Sweet fern they do not like very well, but they have cleaned all of the hardhack out of this piece. Ferns and brakes have been eaten to some extent. They have eaten the leaves and young sprigs of bushes in preference to grass. Birches two inches or more in diameter they have not injured, but they have stripped the bark from every maple. Even maple trees six inches in diameter have been thus killed. We have found them to be fond of the bark of apple trees, even eating the bark from old trees.

"To clean up birch or evergreen woodland, they have proven very effective. There has been practically no cost for the summer's keeping. The twelve goats have been kept without other

RESULT OF GOATS ON BRUSHWOOD IN IOWA.

food on one acre of young woodland. They have required no care other than an occasional visit to see that they are all right and that they have water."

Here is the experience of another New England gentleman, W. O. Corning, of New Milford, Conn.: "I first fenced off ten acres with American wire fence thirty inches high, and no goat has ever jumped over that fence yet. I also built a shed for them to stay in nights and rainy days, which they nightly utilize, and at any signs of a shower or storm they march into that shed in military precision, and when the storm is over out they go in like procession to resume their daily task, like the busy bee. On the 10th of May these goats were turned into this lot and it was soon evident that it would be but a short time before they would need a fresh field. On the 19th of June, just thirty-nine days after turning the goats in, I had to cut down quite a lot of chestnut trees to give them leaves to feed upon. This piece of land looked as if a cyclone had struck it. The goats broke the small brush down and devoured the leaves of sumachs eight and ten feet high. Grass soon began to grow, and the present indications are that next year a fine crop of grass will grow where before it has been almost barren, now fertilized by these goats.

"The work they have done is beyond my expectations, and what has been said about their efficiency as brush or land cleaners that I have read or heard has not been overdrawn."

Now, let us have another testimony, this one from Hon. James S. Hogg, ex-Governor of Texas, who had a flock of 104 head when he made this statement: "Goats have a predilection for desserts very much like the human race, but I never discovered this until I made this recent purchase. My goats go out in the morning and feast on briers, young saplings, cacti, and other substantial food products until about noon, when they turn their attention to this year's growth of limbs, including leaves, where they cut six or seven wide swaths, then along about eventide they finish up on about 104 saucers of poison oak leaves. They arranged the bill of fare to suit themselves and manifested no desire for a change. They are perfectly willing to work for their board and give me their clothes. They are doing good work, too."

A. Kemble, of Muscatine, Iowa, was the gentleman who readily paid $1,400 for the sweepstakes buck at the Kansas City exhibit in 1902, and thousands have questioned his business judgment if not his sanity; but the gentleman knew what he was about, for he was already a goat raiser, and he knew their value. The following are some of his remarks after he purchased Aztec, the prize buck mentioned above: "Last March my sons came into possession of

FOUR FAMOUS ANGORAS.

Bred by D. C. Taylor & Son, Lake Valley, New Mexico. No. 1, Toltec; No. 2, Montezuma; No. 3, Champion Aztec; No. 4, Andy Jackson.

the Daniel Hayes ranch over in Illinois. The ranch consisted of about 1,200 acres. Something like 500 acres was in cultivation, but the other 700 was underbrush and land hardly fit for pasture. I undertook the supervision of the property, and the first thing I tried to do was to put as much of it as possible under cultivation. I tried all sorts of schemes to rid the land of the brush and clean it up, but by far the best and surest remedy was the Angora goat scheme. Last May I bought 240 head and they cleared 100 acres in a short time and left a fine growth of blue grass and clover. In another year what was once a tangled wilderness filled with wolves, snakes, and the like, will be the finest pasture land in the country."

The curse of the valuable lands of the Hawaiian Islands is a shrub, or small tree, known as lantana. The question with the residents is an important one, as to how to eradicate it. The writer has several times been asked whether goats would not destroy this shrub as well as others in the States, but it is only recently that he has seen a statement by a native Hawaiian that goats had been known to destroy this plant utterly and he recommended that they be employed in large numbers for the purpose. It is believed they will save 75 per cent of the present cost of clearing the land. It seems they are trying so-called "scientific methods" there by attempting to destroy lantana by parasitic insects. The employment of goats may not be so scientific, but it would certainly be more rational, with every chance of better success.

Morris Lewis, of Ottawa, Ill., has quite recently published the following statement: "In the spring of 1901 I fenced 47 acres of the heaviest brush I ever saw. This land is three miles from Belleville, Ill. I used 27-inch woven-wire fencing with two barbed wires on top. On this 47 acres I put 175 Angora wethers. In the fall of 1901 I sold 100 of the wethers and wintered the rest on corn fodder, feeding it on the ground, the goats having the run of the 47 acres and access to a warm, dry shed. I sheared the first of April and the mohair more than paid the expense of wintering. Last spring (March, 1902) I sowed timothy and clover over this land and I did not see the land again until October, when I went to Belleville to see what condition the land was in. There is not a live bush or shrub on the tract and there is a complete stand of timothy and clover. I find that I will need the goats no longer. In the spring I will put cattle on this land and will continue to use it in this way until the stumps are rotted out, when the land will be put in corn. A lady whose land ad-

joins this pasture was so well pleased with the result that she put in a load of goats last spring.

"Hereafter I will keep only a few purebred goats to keep down any sprouts and to eat the weeds along the fence lines. Good goats pay well."

The suggestion contained in the following from H. T. Fuchs, Marble Falls, Tex., should be of value on thousands of farms where the cocklebur has almost gained the mastery: "A few years ago the Colorado River washed away a great deal of my field fence and covered the bottom land with cockleburs all along the river. It looked like a forest of cockleburs. To save the crop I had to build a new fence, joining the river on the upper side of the field, so that goats could not keep down the weeds along the river inside of the field, but they kept all the cockleburs eaten up clean so far as they could go. Last winter I hired help to beat down the ripe cockleburs from the dead bushes inside the field and built a new fence of eight wires parallel with the river and opened the whole bottom to the goats this spring after shearing. At that time the cockleburs and elder bushes had entirely covered the entire bottom for the distance of a mile, and it looked like the goats would get lost in there, but after about two months I had the great pleasure to see that the bottom was as clean from cockleburs and elder as pecan gatherers may wish for."

At this time there might be added to the testimony of these gentlemen that of every one who has used goats for the same purpose; but, because of this unanimity of sentiment, it is not deemed necessary to produce more testimony here. It is strange, however, that statements of this habit of the Angora goat are the most difficult for people to accept. They believe it is beautiful, that it gives nutritious milk, that it is good to eat by those who have no scruples about the matter, and that its fleece is worked up into fabrics the most beautiful and durable; but when it is told how they will convert a wilderness into a rich pasture, doubt takes possession. Doubters may be assured that the testimony of the gentlemen who are qouted above is that of thousands of others at this time, and evidences in the way of the cleared land itself may now be seen in every State.

In those localities where valuable land is completely subdued by brushwood the goats are considered of more value for the purpose of clearing it than for their mohair or meat. Thus they become a most important tool to the farmer. Their value in this respect must be measured by the value of the land which they render cultivable. In Oregon it has been estimated that the average cost of clearing the brush land was $20 per acre; the goats have

done better work and "boarded themselves." In southern Ohio, in Maryland, West Virginia, and Virginia, and probably in the Carolinas as well, the cost of clearing away the brush is about $12 per acre; the goats do it for nothing. Apparently the goats require more time to make a perfect job than men, but it is only apparent; their work is better done, and they enrich the soil from the day they first set hoof upon it. Sprouts spring up behind the grubbing hoe to torment the farmer year after year.

The work of clearing land may be hastened if the trees which are too large for the goats to manage are felled with the ax. It is a real pleasure to see a flock of goats pounce upon a tree just cut down; they enjoy the tops so much that oftentimes they will interfere with the chopper while waiting for the tree to fall.

It is a good plan to defer the chopping until the winter season, for two reasons; it is, first, the most convenient time for the farmer to do this work; and, second, it affords the goats a supply of browse at a time when they need it most.

Brushwood as Permanent Pasturage.

The inherent tendency of goats to climb leads them to hillsides and rocky cliffs, and they prefer such situations to any of a level character. Here nature meets their necessities by dwarfing the bushes so they may be browsed easily; the soil is quickly drained when there is rain; and the stones serve to keep the feet trimmed properly by the wearing process. This is the situation that the goats would choose for themselves, but the farmer in most cases prefers to confine their operations upon land that will be more profitable after it is cleared.

There are in the United States millions of acres of brush land which could be made suitable for little else than goat raising. It is desirable, then, that such brushwood should not be browsed to death, but be so manipulated as to provide feed for the goats year after year. The way to do this is not difficult. One method would be not to overpasture the land, permitting the brush to grow as fast as it is consumed. Another practice would be to pasture one field every three or four years only. As brush must be subdued continuously for two or three years in order to kill the roots, the sprouts will grow vigorously after one year of browsing if the goats are taken away. There are so many more acres, however, which when cleared will make the richest pasturage and cultivable land, it is not at all probable that there will be any considerable interest manifested in maintaining brushwood for goat feed.

The kinds of brush and weeds which goats will feed upon

KING CROMWELL, NO. 1147.
OWNED BY R. C. JOHNSTON, LAWRENCE, KAS.

cover pretty nearly every variety of vegetation. They are not fond of hickory and alder, yet there are instances where they have eaten the latter with apparent greediness. Pine is not a regular diet, yet they will eat much of it during the year. The broom sedge, which is such a nuisance in fields in Maryland and the Virginias, and which will not be touched by other live stock, is a favorite feed with goats if they can have it as it grows; and this is one grass which they like to mix with their browse.

One Year of Goating Not Sufficient.

It must not be understood that a piece of land so cleared is ready for pasturage or the plow after the first year. Nature is not so easily subdued. Most shrubs will start anew from the roots and therefore the goats should have the run of the woodlot, for at least a part of the time, during two or three years, if the purpose is to convert the land into pasture or to cultivate it. The goats regard these young sprouts as the most delicate morsels and not one will be permitted to grow. The result is that all shrubbery will soon give over the battle and blue grass, if the section is one where blue grass is indigenous, will rapidly follow. Let the important fact be mentioned here incidentally that during the time the goats have been upon such a piece of land they have deposited very evenly upon it a large amount of the richest kind of manure. This aids the grass in its efforts to establish itself.

Some Objectionable Features of Brushwood.

The statement has been reiterated over and over by the newspapers, in mentioning the spread of the Angora goat industry, that these goats will eat all kinds of poisonous plants without any harmful results. While there is much evidence pointing to this conclusion, it ought not to be taken as a settled fact. If experiments were undertaken it might be shown that a plant which is poisonous to sheep or cattle is also injurious to goats. It is observed that goats feed upon brushwood by snipping off a leaf here and there—from a pine here and a cedar there, a grass blade here and a weed top there, and so on; they do not, like the sheep or cow, eat a weed entirely or strip a bush clean before passing on. The result is that the goat's stomach is filled with a great variety of food and not much of any one kind. If by chance a few poisonous leaves are eaten, they are probably neutralized by the large quantity of other food eaten.

Upon a farm in Pennsylvania there was a patch of laurel where goats had passed it by during the whole season. This was evidence that they knew it was not good for them. Later in the sea-

ANGORAS ON EDGEWOOD STOCK FARM, MENDON, ILL.
Property of Geo. H. Baldwin.

son several hundred goats were turned into that same pasture after a long journey and when they were very hungry. The laurel patch was the only green food in sight and they ate of it greedily. The next morning found 300 of them very sick and 50 dead. What had proved harmless to the goats that had been there when there was an abundance of other feed proved exceedingly poisonous to the hungry newcomers.

While it is possible that goats may not eat laurel to such an extent as to be injurious if placed in a pasture where it is growing with other browse, it can not be considered a safe practice. The owner of the Pennsylvania farm referred to found it to be a short job and not expensive to "snake" out his laurel patches with a team and log chain. So brushwood need not be abandoned because there are patches of laurel upon it.

The laurel best known is the narrow leaf variety (*Kalmia latifolia*). According to Dr. V. K. Chesnut, the Government authority on poisonous plants, this species "is abundant in the northeastern section of the United States, where it is also known as sheep laurel and lambkill. The leaves contain andromedotoxin, and sheep and calves are quite frequently poisoned by eating them."

The greenbrier, which appears to have a wide distribution in the United States, is an enemy to goat raising; not that it is poisonous, but because of its physical character. It is a climbing shrub, very wiry, and well covered with very hard and tenacious thorns. They grow in clumps and to great length, and preferably on lowland and near creeks or ponds. It is a very easy matter for these thorns to catch in the fleece and hold the animal fast until it dies. No goat has strength sufficient to break the shrub and the thorns do not give way. This shrub should be cut down with a brush scythe and burned before goats are permitted to go among them. Where goats have had access to greenbriers immediately after shearing, when there is no fleece to catch upon the thorns, they have destroyed the briers by eating the leaves and by girdling.

It is probable that large blackberry briers may be objectionable for the same reason, but ordinarily goats will destroy them without much difficulty. If goats have an opportunity to get at any of these briers as they are putting out in the spring, they will not permit them to mature.

Grass Will Follow the Goats.

Reference was made above to the fact that blue grass often follows where goats have cleared off the brush and weeds. This,

"AFRICO," THE GOLD MEDAL BUCK, AND A GROUP OF DOES.
Owned by Mrs. M. Armer, Kingston, New Mexico.

of course, is not because the goats have anything to do with the spread of blue grass, but simply because their work gives the grass an opportunity. Other grasses native to the locality are apt to "come in" in the same manner. We have traveled along our country roads all our lives and seen the grass growing on either side better than anywhere else when not cultivated, but the thought never occurred that the same conditions might be brought to large areas; yet, all the grass was waiting for was an opportunity —waiting for the brush and weeds to get out of the way. The goats attend to this part of the work. The grass comes, and comes vigorously if the soil is at all rich; and if the goats are still on the land, they will not molest it if they can find browse.

Goats as Grazers.

While it is true that goats prefer browse, it is also true that they will subsist nicely upon grass. So the absence of brushwood need not deter any one from engaging in the industry if other conditions appear to warrant the venture. Philo Ogden, of Upperlake, Cal., who is a successful breeder and mohair grower, believes in grass and is opposed to brush as a food for producing mohair. He says: "The fact is that as the brush disappears from my range the fleeces become heavier, with less wax, or gum, and has more luster. Fully 75 per cent of the young stock are larger than their parents and shear more and finer hair."

John S. Harris, of Salem, Oreg., is also a believer in grass for goats. He maintains that the fleece grown on grass is superior in almost every respect. He says a little browse will do no injury, but all grass as feed will do no harm. S. S. Brannin, Silver, Mont., whose goats subsist largely upon grass, believes, with the greater number of goat men, that a mixture of diet is the best. He says all stock become very fat upon the gramma, or buffalo, grass which grows there, and adds this interesting note: "I have taken over 20 pounds of rendered tallow out of one three-year-old wether which dressed 65 pounds."

Browsing Supplements Feeding.

The browsing habits of goats is important in connection with the question of feeding. In some places they obtain enough browse to carry them through the winter. This is especially true in the Southwest, where there is so great an abundance of live oak. If snow is on the ground, or for other reasons the goats are deprived of opportunities for foraging, the trees are cut down for them. They pass through the winter in good condition with little other feed. Wherever they are deprived of opportunities

for browsing, they must be fed. Browsing saves feed. As far north as Nevada, C. P. Bailey's goats subsist through the winter on sagebrush.

Browsing Adds Game Flavor.

It is noted that many of the correspondents heretofore quoted state that it is the browsing of the Angora that gives to the meat the game flavor, thus leading some to name the meat "Angora venison." It is also stated that when deprived of browse and fed on grass and grain, the game flavor disappears. There is no reason why this should not be true, for it is a well-known fact that flavor may not only be fed into meat, but into milk and eggs as well.

Common Goats as Brush Destroyers.

The fact must not be overlooked that the brush-destroying habit is common to all kinds of goats. The common goats will do the work as well as the Angoras. The latter are employed for the purpose because they are more plentiful and because there is profit in their progeny for breeding purposes, their mohair, and their meat. There are many common goats in the South which might be employed as brush destroyers, especially if the first cost of Angoras is considered too expensive. In southern Florida, where it costs $50 per acre to clear a farm, it might be well to try the common goat, for the location is probably too low for the Angoras to thrive well.

Pasturing with Other Stock.

So far as the goats themselves are concerned, they may be kept in the pastures where there are sheep, cattle, and horses. Their presence is in no way obnoxious to any of these animals. It has already been pointed out that a few of them in a flock of sheep are a protection against dogs. However, it is not best for the goats that they be kept in pastures with horses. This is especially important if there are kids, as the horses have a habit of playfully chasing any animal that is not large enough to defend itself, and they are apt to strike the kids. It is also important that the kids should not be in pasture with hogs, which are liable to eat them; indeed, the grown goats are apt to be attacked by the hogs if they should be disabled from any cause.

Number of Goats to an Acre.

This is a question frequently asked, but certainly no thoughtful person expects a definite answer. The number will depend, first,

upon the object in pasturing on brush land, whether it is to kill the brush utterly or to use it as a permanent pasture; and second, upon the quantity of feed obtainable. While one acre might be as dense as a jungle, another might have small thickets alternating with grass plats. Thus it will be seen that a definite answer can not be given to this question. There are not many patches of brushwood so dense that four or five goats to the acre will not level it during one season. Ordinarily, the tendency is to put too many goats on a tract, with the result that they soon get into a starving condition. They must not be expected to climb trees nor to eat the boles from one to six inches in diameter.

CHAPTER VI.

MOHAIR AND MOHAIR MANUFACTURES.

Fleece of the Angora Goat.

The word "mohair" is the technical name for the fleece of the Angora goat. The word comes to us, through the old French "mohere," from the Arabic "mukhayyar," meaning mohair cloth. It differs from the wool of the sheep in that it does not have the felting properties of the latter. The felting property of wool is due to the presence of scales, or epithelia, which cover the fiber in much the same manner that scales cover fish. It is the felting property of wool which distinguishes it principally from other animal fibers. Mohair is a hair proper, being devoid of scales, and so is not successfully used alone in felt goods.

The fleece upon the goat is pure white, is exceedingly lustrous, and grows to an average length of 10 inches annually. It hangs in beautiful wavy curls, or ringlets, from all parts of the body, if the animal is of the best breeding. The average annual production per head of mohair is about 3 pounds. The grade of the goat has much to do with the weight of the fleece. The first cross of an Angora buck upon a common doe gives but a small amount of mohair, but the increase in quantity is notable as the crosses come higher.

According to tests conducted by Dr. William McMurtrie, and published by the United States Department of Agriculture in 1886, mohair is not equal to wool in fineness, but in strain there is a difference much greater than would be suggested by the larger fiber. The average wool fiber in these tests stood a strain of 108.79 grains, while the average mohair fiber stood a strain of 295.11 grains. This is a difference of 186.32 grains—much more than double the strength of wool. It is to this strength of fiber that the great durability of mohair goods is ascribed. In stretching quality there is but a slight difference between mohair and wool. Dr. McMurtrie makes the point in discussing wools that the individual fibers may be variable in size, a condition brought about, it is supposed, by sudden changes in weather or feed, or by ill health. Dr. McMurtrie's remarks on this question are applicable to mohair, and so are copied here somewhat extensively: "In the

study of the wools constituting the collection under present examination, one can not avoid being struck with the lack of what the German authorities term Evenness Treue, or uniformity in the diameter of the fiber throughout its length; and this property is probably one of the most important, if it does not even stand first, in the determination of the commercial and industrial value of the staple. It is the result of two causes—the one atrophy of the fiber at certain parts, and the other hypertrophy. In other words, when we examine a sample of uneven staple with the microscope, we notice a greater width of the images at some parts than at others, and these variations are by no means wanting in interest, nor are they absent in many of the animals said to have received excellent care and feed. In some cases we find a sudden contraction of the fiber at certain points (atrophy) and this is often sufficient to give the edge of the image a decidedly notched appearance. In other cases the contraction is more gradual, the progressive diminution of the width of the image extending over a greater length of the fiber. In the enlargement, however (hypertrophy), such sharp variations do not obtain; the fiber begins to enlarge at a certain point, and the enlargement may continue through the length of the fiber until it attains a diameter even twice as great as at other parts. * * *

"Where atrophies occur the fiber must necessarily be weakened, while, on the other hand, staples in which the atrophied fibers occur in any important portion must interfere with the regular passage of the material through the several machines and the processes of the factory. In both cases, therefore, they seriously impair the value of the product, and it behooves growers to look to the causes which may have a tendency to bring them out. What these causes may be we have had no opportunity to determine, but there can be little doubt that bad nutrition, exposure, and the consequently impaired health and constitution are the more prominent. A fevered condition of the system probably tends to check normal exercise of the functions of the skin, and hence the growth of the fiber resulting in atrophy, or it may have the contrary effect and cause hypertrophy. * * * We have sufficient evidence to show that when animals have been well fed and cared for, and when the health of the animal has been uniform, such deformities in the fibers do not exist. And that the growth of the wool is retarded, or at least that the diameter of the fiber is diminished by impaired health of the animal is well illustrated in the following bit of our own experience. On one occasion a prominent breeder of Merino sheep submitted a sample of his wool for the determination of its fineness. By

the system of measurement followed we found that the fibers were finer at a certain part or point in their development than at others, and by simple calculation it was easy to determine at what part of the season the finer portion of the staple had developed. We stated that at that season the animal must have been in ill health, and this was afterward confirmed by reference to the record of the condition of the different individuals of the flock during the year. And it further illustrates the importance of great care in the management of sheep and the value of protecting them from any sudden changes and from the inclemencies of the weather in general."

All mohair has a luster peculiarly its own, but this is much more pronounced in some fleeces than in others. That having the higher luster, other qualities being equal, commands the better price. A fleece of low luster indicates a goat under influence of adverse conditions—as poor breeding, poor feeding, or sickness. The uninformed often express the opinion that this luster is due to oil in the fleece, but this is erroneous. Whatever oil there may be in mohair is inside the individual hairs, and not on the outside, as in the case of wool. There is sometimes a gummy substance which causes a fleece to become badly matted, but this is not due to oil in the fleece. A mohair fleece may be washed, then scoured, and then steamed, dyed, and worked up into fabrics after reaching the mills, but none of these processes removes any of the luster; indeed, all of them operate simply to intensify it.

Two or three years ago the mohair producers were happy in the well-founded hope that they would, within a few years, be able to produce mohair equal to that grown in South Africa, and they also dared to indulge the hope that some time in the future they might be able to equal that of Asia Minor; but they were surprised this year when it was announced that there were even now many fleeces equal to the Turkish product. As stated in a previous chapter, George G. Emery, of the Sanford Mills, Sanford, Me., showed at the exhibit of the American Angora Goat Breeders' Association in October, 1902, two fleeces of plush, one made from American mohair and the other from Turkish. They were woven alike and colored alike, and it was simply impossible for any one to distinguish between them.

While there is yet but a small quantity of such excellent mohair produced in the United States, this fact shows that it can be grown and everybody knows the American energy always turns possibilities into facts.

Presence of Kemp in Mohair.

It is a fact well known to breeders that the Angora goat has two coats of hair. The outer and more abundant coat is the mohair, while the under coat is a coarse, chalky white, straight, stiff hair, varying in length from one-half to 4 inches. This under hair is known by the name of kemp. It is generally believed to be the relic of the common goat blood in the Angora, for it is a matter of history that the Angora flocks of the United States, as well as those of Asia Minor and South Africa, have been largely increased by crossing upon the does of common blood. This has been done to such an extent, indeed, that it is no longer contended that there remain any Angora goats of absolutely pure blood. This belief in pure blood is based upon the fact that the first cross of an Angora upon a common doe yields a fleece in which kemp largely predominates, and that as the crosses become higher the quantity of kemps grow less. That point has not yet been reached, however, where it can be said that a strain has been produced which has no kemp whatever, although a few breeders in this country and in South Africa appear to have very nearly reached that very desirable result. This is the principal end to which breeders should lend their best efforts at this time. It is the most difficult quality to obtain. Length, strength, fineness, and luster may all respond readily to the intelligence of the breeder, but kemp is stubborn. The hope is confidently expressed by the best breeders that a strain of Angora goats will yet be produced which will be entirely free from kemp.

The spirit of the goat men who meet annually in Kansas City in attendance upon the meetings of the American Angora Goat Breeders' Association, shows that they were not only willing but anxious to undertake the solution of this problem. While all these men were familiar with kemp and knew that it was a deleterious feature of mohair, not many of them knew before these meetings were held how objectionable it really is to the manufacturer and consequently how much it tends toward keeping the price of mohair low.

At Kansas City the mohair producer and the mohair manufacturer met each other for the first time in this country. The presence of both being in the interests of the Angora goat industry. George G. Emery, of Sanford, Me., addressed the Association on several occasions, his theme each time bearing upon the quality of fiber required by the manufacturer. He displayed a large assortment of goods, using them to supplement his argument concerning the uses and value of good mohair as compared with the poorer grades. The goat men showed a disposition to learn

all that is required by the manufacturers and determined to redouble their efforts toward a higher standard for their flocks. The large price of $1,050 was paid for the buck Columbia Pasha at the Kansas City goat show in 1901 and $1,400 for Aztec in 1902, principally because of their freedom from kemp. It is true that their fleeces were fine and long and their bodies were fully covered, but the appearance of the animals as they stood in the pen (their size and carriage), although they were "good lookers," had comparatively little weight with the judges, who gave to them the sweepstake prize as the best bucks of all ages in the show.

Why Kemp is Objectionable.

The reason why kemp is objectionable is that it will not take the dyes used for mohair; the only effect of the dyes is slightly to discolor the kemp. There are dyes, it is true, which act upon kemp, but they have no effect upon mohair; and the best efforts put forth have not yet resulted in a mixture of dyes that act satisfactorily upon both mohair and kemp at the same time. The only solution, therefore, is to remove kemp from fleeces which enter into the manufacture of fabrics in which it is undesirable.

Kemp appears in its worst phase in plushes, where every individual hair shows prominently. Its presence here is much more pronounced than when in the fleece, where it is nearly the same color of the mohair. It is therefore of great importance that this objectionable substance should be removed from the fleeces. If any kemp should escape the eye and be woven into the plush fabric, it would not be discovered until the fabric came from the dye, for it must be remembered that mohair plushes are woven "in the white," and afterwards (perhaps several months or a year) are dyed according to instructions to fill orders. Kemp, at this stage of the process, becomes an expensive proposition, for skillful hands must burl out every fiber of it as well as every other bit of foreign substance. In the cheaper plushes, such as are largely used in street cars, there is a considerable quantity of kemp. Much of this material may also be used without detriment in the manufacture of rugs.

The problem of the mohair manufacturer is the same as that of the mohair grower—how to get rid of kemp; and the burden of his meditations is to devise some sort of machinery that will do the work perfectly. American ingenuity has so far failed to invent such a machine; and so the manufacturer finds it necessary to call upon the breeder to produce mohair without kemp. The solution of the problem, therefore, appears to be with the breeder rather than the manufacturer.

But the fact remains that the mills must get rid of kemp in some way, and the device which they use for the purpose is a machine which combs it out; but while the comb is removing the kemp it removes at the same time every mohair fiber of equal length with the kemp. This means that if the mohair going into this comb has kemp 3 inches long all mohair fibers up to 3 inches in length must go out with it. The result is heavy loss. True, there is a use for this mixture of kemp and short mohair, as heretofore stated, in the manufacture of cheap goods, such as horse blankets and filling for carpets, and also for stuffing saddles, and it has a value ranging from 7 to probably 10 cents per pound. From the breeder's standpoint this residue from the combs will be considered as a loss, and he must figure it as wastage. This wastage runs from 5 to 40 per cent. It is eminently proper to quote here the opinion of one who has spent many years in fabricating mohair, namely, George B. Goodall, of Sanford, Me.: "A majority of the mohair growers in this country little realize how much kemp has to do in keeping down values of their clips. If they could spend a few hours in our sorting and combing rooms, the lesson learned would be of great value to them—more than could be obtained by reading. In watching the combs at work they would notice some making 5, 10, or 12 per cent of noil or waste, while others will be taking out 30 or 40 per cent. Ask the comber the reason of this, and he will reply that one lot has a much larger amount of kemp than the other. One fiber of kemp takes out five or six good fibers which should go into yarn."

The thought has probably already occurred to the breeder that the longer the kemp the greater the wastage. But how can kemp be shortened? is the question of importance next to getting rid of it altogether. It is generally accepted as a fact that long kemp is evidence that the animal producing it is bred up from long-haired Mexican does, while short kemp is a relic of short-haired does, such as are quite common in suburbs of large cities. If this be true, the point is already made that, in building up a flock from common does as the foundation, none but short-haired ones should be used.

Let it be said in passing, however, that there are so many thoroughbred and high-grade Angoras in this country now that the reason or necessity for crossing upon common goats does not exist as it did several years ago. To continue the practice is to continue the injection of kemp into Angora blood. The crossing upon common stock has been done with the double purpose in view of increasing the flocks more rapidly and of infusing stronger blood into the Angoras. As stated above, the necessity for the first is

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probably past; with regard to the second, it can be said that there are now in the country strains of Angoras which are as large and vigorous as any common goats may be. These might be used to impart constitution to the delicate flocks.

Finally, concerning kemp, its presence in mohair is not objectionable on the score of durability, for it has lasting properties, but its coarseness and its inability to take mohair dyes make it undesirable.

Durability of Mohair Fabrics.

The durability of mohair and mohair manufactures is well known to those who are familiar with their use. Statements which to some may seem incredible are on record, but there is no good reason to doubt their accuracy. S. Holmes Pegler, author of the excellent English work, "The book of the goat," states that in 1881 the Duke of Wellington imported a half dozen Angoras from the Cape, and many of the clothes worn by the duke were from the fleeces of these goats, and he continues: "I myself possess an overcoat made from the same stuff, presented to me by his Grace, which promises to be everlasting as regards wear." Dr. James B. Davis, who first introduced Angoras into the United States, having himself brought them from Asia Minor, says in an article which he published in the Annual Report of the Department of Agriculture for 1853: "I have socks which I have worn for six years and are yet perfectly sound." A friend of the writer states that he has had one mohair rug at his office door for twelve years, and it does not yet show much wear, while the luster and color remain as distinct as when new. Ladies who have worn mohair crepons and brilliantines are all aware of the wonderful durability of this fiber.

Strange as it may appear upon first thought, it is the durability of mohair dress goods that has prevented their more extensive use heretofore. The first cost being somewhat high, they have not generally been worn by people whose principal aim is durability in the purchase of clothing. They have been subject to the caprices of fashion, being "all the style" one year and "out of style" the next. This has naturally restricted their use largely to that class of people who could afford to discard them before wearing them out.

Influence of Food and Care of Goats on Fiber.

Any wool grower knows that feed and care have a very great influence upon the weight and fineness of the fleece. The same is applicable to mohair growing as well. If goats are exposed to

sudden changes of weather, the effect is shown in the fleece. Under adverse conditions an individual mohair will show contractions, which greatly reduce its "stretch" and "strain." This point is fully covered in the quotation already made from Dr. William McMurtrie, and need not be further mentioned here.

John S. Harris, one of the early breeders of Angora goats, and who is a man of good observation and rare judgment, says that the finest and evenest mohair is from goats which feed upon grass. He says that brush is "pie" to goats, and a little pie will do no harm, but all pie is not good. While this is contrary to the opinion of most breeders, the experience of one who has so long been raising goats should not be hastily cast aside.

S. C. Cronwright Schreiner says: "If goats are to produce the best fleeces they are capable of, they must be maintained in uninterrupted good condition. They must have a variety of food, principally shrubs and aromatic plants, and lead an active life; they must, if possible, have running water to drink, and be kept free from dust; they must not be kraaled (or shedded) except when absolutely necessary; they must have clean sleeping places, and must not be crowded together.

It is the opinion of the writer that the many important points concerning length, strength, and fineness of fleeces should be the subject of scientific experimentation, which experimentation should include the effects of feed and climate. The results of an investigation of this character would answer as well for the sheep industry of our country, with its annual wool production of 289,000,000 pounds, as for the growing mohair industry, for the same conditions govern with both fibers.

Prices of Mohair.

A long chapter might be written about the reputed prices obtained for mohair during the first few years after the introduction of Angora goats into this country; but as there were no mills in this country at that time which were able to fabricate the fleeces, and as the quantity of mohair produced was very limited and of uncertain quality, and as there appears to be no definite data available of sales made at the enormous prices which are sometimes referred to, it would seem that no useful purpose will be subserved by discussing the prices of that period. Attention will be given, therefore, to the prices of the present, for these are the prices which interest the mohair growers of to-day.

What has been said in previous paragraphs about varying qualities of mohair has no doubt suggested the thought that prices also are very variable, which is true. It is not the quality alone

which affects the price, but supply and demand, which affect all articles of commerce, play a very important part. It was decreed by Dame Fashion last year, for instance, that mohair dress goods were not in style, and the effect of this decree was to reduce the value of mohair. Other causes, a principal one of which was a very limited demand for car plush, also contributed to the cause of low prices.

To give a brief answer to the question, What is mohair worth? is not possible. There are more grades of mohair than there are of wool, and there has so far been no effort on the part of mohair producers to so sort their fleeces as to enable them to receive the highest price for each class, but they have been content to sell it in one mixed lot. This always tends to reduce the price below its real worth, because the purchaser, not knowing exactly what he is buying, protects himself with a low price. The features that make for low prices are shortness and coarseness of fiber and the presence of kemp, burs, and dirt of all kinds. There were on exhibition at the recent Kansas City show some fleeces which looked as if they might have been raked out of a filthy hog pen; these had been sold at 7 cents per pound, while other fleeces in the same exhibit were worth 40 cents per pound.

Probably the average price paid for mohair during the season of 1901 was about 25 cents per pound. It was a little higher in 1902. The product of the lower crosses, which contains a large percentage of kemp, brings a low price (10 to 15 cents), while there were some fleeces that brought 40 cents. There is not a large quantity of this latter quality of hair produced in this country, for the reason that the breeders have not given the matter proper attention. There is a great demand for the better hair, while the lower grades, which enter into the manufacture of carpets and horse blankets, find direct competition in wool.

In this connection it should be stated that the coarsest and longest hair is just now bringing very high prices. L. Levussove, of New York City, has been buying all of this kind that he could secure, paying from $1 to $2 per pound for it. This grade of hair is used in the manufacture of wigs, doll hair, etc. How much of a demand there may be for this quality of hair is a matter difficult to determine, but at this time Mr. Levussove can not secure an ample supply. It is obvious that the hair must be very long.

While on the subject of prices we will quote from a recent address by George G. Emery, of Sanford Mills, Sanford, Me.: "I have read where prices as high as 45 cents per pound have been paid this season for domestic mohair. Now, such statements

AMERICAN MOHAIR.
"Slipey" hair on left. Coarse hair next. Then good hair.

should be followed by an explanation, otherwise false hopes are apt to be raised in the minds of the growers, which hopes, in my opinion, are not to be realized. I can take any bale from among the hundreds sent us yearly from the State of Oregon (and the same applies to the twelve months' growth of Texas hair; in fact, in any State producing mohair to-day), and I can find mohair which is worth 45 cents per pound and even more, but the percentage of the low grades, worth from 18 cents to 20 cents, is so much greater and so far overbalances the fine as to bring the value as a lot to a much lower figure. I have seen some very choice domestic mohair, but the amount of such hair is very small when compared with the total production of the country."

Prices in the Cape of Good Hope have ranged about the same as in our own country.

The great mohair manufacturing center of the world is Bradford, England, and as it will be interesting to many to see the prices which mohair has brought in that city during a long series of years, the following table is prepared from data compiled from the Bradford Observer by the National Association of Wool Manufacturers:

RANGE OF PRICES OF MOHAIR AT BRADFORD, ENGLAND, FROM 1856 TO 1894.

Year.	Cents.	Year.	Cents.	Year.	Cents.
1856	48 to 56	1869	86 to 88	1882	38 to 45
1857	56 to 66	1870	92 to 98	1883	40 to 43
1858	60 to 72	1871	78 to 84	1884	37 to 45
1859	72	1872	82 to 90	1885	28 to 36
1860	76	1873	72 to 80	1886	23 to 32
1861	76	1874	70 to 90	1887	25 to 29
1862	72 to 78	1875	82 to 92	1888	24 to 28
1863	80 to 88	1876	86	1889	25 to 42
1864	78	1877	60 to 70	1890	27 to 36
1865	70	1878	60 to 66	1891	24 to 28
1866	80	1879	36 to 54	1892	24 to 29
1867	66 to 90	1880	42 to 54	1893	24 to 37
1868	58 to 76	1881	38 to 42	1894	27 to 31

But what of prices in the future? This is the important question with the breeder, and it is one that is difficult to answer. It seems likely that there will be an increasing demand for mohair in the classes of goods which now consume it, to say nothing of the new uses that may be developed; hence it may be expected that the demand will be strong. On the other hand, there will doubtless be an increased production, which will have a tendency to lower the price. There are so many uses for mohair already established in the world that it is not believed that prices will ever fall to a level with wool. One prominent manufacturer of mohair goods expresses the opinion that the "average prices paid this

year (1901) can be considered as low-water mark." This was about 25 cents a pound, as stated above.

The American Wood and Cotton Reporter states that with an increased production of Angora goats in this country, and the consequently enlarged production of mohair, the latter is going to be consumed more largely than heretofore, and is, indeed, already "cutting more of a figure in the wool market."

The domestic product is favored by a tariff of 12 cents per pound on the imported article.

Mohair Manufacturers.

The first striking feature of mohair manufactures is their great beauty. The luster of the hair, which is so pronounced even while it grows upon the goat, remains in the manufactured goods, and no amount of washing and no character of dye will remove it. It aids the dyes to show their colors more effectively and imparts to the goods the pleasing property of changing shades in shifting lights, which is a feature quite characteristic of silk goods.

A second feature of importance is that the dyes are usually fast, and however much such goods may be exposed to the elements they will not fade. In the best mills fugitive dyes are not used except when an order is received to match a sample which has been treated with such dyes; for a fugitive dye can not be matched by a fast one, nor can a fast dye serve for a fugitive one.

The durability of mohair goods has been quite fully discussed in connection with the durability of the fiber composing them. It is a characteristic that ought to make their use economical in many ways. This should be the case especially with dress goods and other wearing apparel.

Mohair manufactures already have a very extensive use, but they appear in the stores under so many trade names that only a few people, comparatively, know that they are the product of the Angora fleece. These manufactures are so varied, and the fiber adapted to so many things which are now made of wool or cotton, that no attempt will be made here to give a complete list of them, but a recital of some of the principal uses of mohair goods will be made, in order that it may become generally known how extensive is their use at the present time, and some idea formed of the possibility of extending the use of mohair to other lines of manufacture.

By far the most important product of mohair manufacture is plushes. It is a fact not generally known that practically all of the plushes used in railroad passenger cars are made of mohair;

so also are the plushes used in street cars. How much is used annually in the pasenger cars of our country can only be conjectured. The report of the Interstate Commerce Commission for the fiscal year of 1899 shows that there was an increase of 244 cars over the previous year; let us add to this a number sufficient to take the place of those worn out, which probably can not be less than 200, thus giving a total of 444 new passenger coaches each year. Each coach requires at least 120 yards of plush, and the total quantity required for the 444 cars would be 53,280 yards. This is an underestimate rather than an overestimate. During the year mentioned there were in service in the United States 16,785 first-class passenger cars, 3,063 second-class cars, 4,206 combination cars, 464 parlor cars, and 488 sleeping cars—total, 25,006. This means that there were in use that year 3,000,720 yards of plush. Add to this all that is used in street cars, omnibuses, etc., for which there is no basis for an estimate, and we may conclude that its use for such purposes is enormous.

Besides the car plushes, which are usually plain, large quantities of frieze and crush plushes are used in upholstering furniture. The designs for the frieze plushes are limited only by the ingenuity of man. The skill of the fabricator is so well developed that the threads forming the designs are in loops and of different color, yet the whole is woven at one time "in the white" and afterwards colored in the same dye. The crush plushes are very handsome, showing to best advantage the effects of varying lights upon solid colors. This kind is largely utilized in upholstering armchairs, but finds large use also in other kinds of furniture. The carriage robes, couch covers, sofa-pillow covers, and rugs are distinguished by their high pile and rich coloring. The pile upon the carriage robes and sofa-pillow covers is about half an inch high. The robes sometimes have the pile on one side only, but many are made with the pile on both sides. The coloring is most exquisite, as is true of the sofa-pillow covers and couch covers. These colors are printed on by hand after the pieces are woven, and are rendered indelible by long steaming. Rugs necessarily require more modest covering, but all the richness of subdued colors and luster remain to make them a distinctly beautiful as well as useful ornament. These goods have not long been upon the market, but they can hardly fail to attract attention and advance in favor.

Most of the so-called astrakhan now in use so extensively is made of mohair. It has all the beauty of the real article, is much more durable, will never change its shade in sunlight or air, and is in no manner inferior to real astrakhan.

TURKISH KID FLEECE.

Plain mohair dress goods (brilliantines) and mohair crepons are common and well known for their durability. There is no other kind of cloth which is more easily cleaned or which retains its newness for a longer period. For this reason brilliantines are especially popular for traveling dresses. Mohair crepons are more beautiful, but also more expensive, costing from $1.25 to $5 a yard. The cheaper grades are woven upon a cotton base, and go to pieces sooner than when woven upon a wool base. In crepons there is sometimes an admixture of silk.

It would be very difficult to enumerate the many ways that mohair might be used in manufactures. Besides plushes, which form the principal item, there may be mentioned dress goods of various designs, coats and coat lining, table covers, knit mits, mittens, gloves, etc., which are already on the market. It has been found that mohair cloth is the only kind that will stand the strain in the expressment of cottonseed oil, and there is a growing demand for it for this purpose. A suggestion has recently been made that mohair could be manufactured into tent and sail cloth and rain coats, having as its qualification durability, lightness in weight, and immunity from molding. Mohair cloth will not only turn water, but will hold water like a skin if the water is not beaten through it. A piece of brilliantine in the form of a bag and holding a glass full of water has been known to hang all day and not a drop passed through it during that time. John S. Harris recently informed the writer that he possessed mohair cloth 40 years of age which would hold water in the same manner. Tent and sail cloths would necessarily be heavier, and be even more effective in turning water. It is argued that the extra cost of this kind of cloth for these purposes is more than compensated for in the matter of durability and lightness of weight.

History of Plush Manufacture in the United States.

Prior to the year 1881 practically all of the plushes which were used in the United States were imported from two countries —France and Germany; and in no one plant in either of these countries was the process of manufacture carried on from start to finish. The merchant imported his mohair yarns from England. This yarn was made up into warps and sent to a house which contained one, two, or more hand looms, and woven into the fabric; generally the head of the house had a son or daughter who assisted him, he throwing the shuttle and beating up the loom, while the child pulled out the wires. The production was from 2 to 3 yards a day, working from fourteen to fifteen hours. After a cut, say 40 yards, are woven, it was then taken by the weaver to the ware-

house of the merchant, who sent it to a dyeing and finishing establishment, after which it was ready for the market.

It is only within a very short time that in France and Germany these goods have been manufactured on power looms in special factories, and even to-day the mohair yarn is all made in England, but the plants, instead of distributing the yarn as heretofore, now take it into their own factories, where it is woven, dyed, and finished.

George B. Goodall was the projector of the mohair plush industry in Sanford, Me. He began experimenting in 1881, and with his own hands placed the first mohair warp in a wire-power loom, and it was he who wove the first piece of plush. As soon as he had demonstrated that mohair plush could be made on a power loom, a company, composed of the three brothers—George, Louis, and Ernest Goodall—was organized for the purpose of entering upon this manufacture. A first-class inventor was consulted, and the perfect working wire-motion power loom now in use at the mill was the final result. The company started with one loom; they now have one hundred and sixty in operation, with a number of new ones in process of construction.

The struggle at the beginning was one that would have discouraged ninety-nine men out of a hundred. Weeks and months passed before a piece of plush that could be termed perfect was produced, but perseverance conquered.

As a result of the manufacture of car and furniture mohair plushes on power looms, where the production was from fifteen to twenty yards a day, the prices have been very materially lower in this country, and within six or seven years from the beginning of the manufacture prices were reduced fully 50 per cent.

Besides the Sanford Mills, mentioned above, the Massachusetts Mohair Plush Company, at Lowell, Mass., as its name signifies, manufactures plushes, having begun this line of work in 1892. For several years these mills used imported mohair almost entirely, but in 1896, finding an improvement in the domestic product, they began to use the latter very largely.

These facts of history answer conclusively the frequent inquiry whether mohair plushes are made in the United States. The statistics of mohair consumption in 1899 show that our mills consumed not only all of the domestic product but over a million pounds of imported mohair.

As the domestic supply increases and improves, other mills will consume much of it. Some do not use it at this time because it is difficult to obtain a supply such as would warrant the purchase of the special machinery required.

CHAPTER VII.

THE MEAT, THE MARKETS, AND THE MILK.

Angora Mutton.

The features of the Angora industry which have received most attention from the general public so far are their habits of destroying brushwood and their ability to produce mohair. Their availability as a meat producer has long been well known, however, to those who have been raising them, and the meat is, without exception, pronounced by those who have eaten of it to be the equal of any lamb. Some are sure that they can detect a sweetness not characteristic of lamb, but the truth is that most people would be unable to detect any difference between Angora meat and mutton, if feeding conditions in both cases had been the same. Indeed, thousands of them even now are sold upon the markets of Kansas City, where they are slaughtered and canned or put in cold storage and sold everywhere as lamb. This is simply the continuation of a practice adopted by the slaughterhouses when there was the most deep-seated prejudice against goat meat. At this time, however, that prejudice is rapidly waning, and soon there will be no difficulty in disposing of Angoras for meat in any place in this country.

This prejudice against goat mutton is founded upon ignorance rather than experience. The most ill-smelling "billy" of the worst possible type is made the standard of goat flesh for the whole goat family. As far back as Abraham's day we read of goats being used for meat, and this, too, when there were many cattle and sheep. Certainly there was no prejudice against them at that time.

The flesh of the Angora is exceedingly nutritious and palatable. Shropshire lambs, which are considered as among the best kinds of meat, are said not to be superior to a well-fed and well-cooked kid. In the Southwest these animals are as readily sold for meat as sheep, and the market has never been overstocked. A gentleman in Texas found a ready market for his canned Angora mutton, but was compelled to close his cannery because the supply of goats was not nearly sufficient to supply the demand. In the Northwest, in nearly every locality some have been killed for mut-

ton, and there has never been a derogatory statement concerning the quality of the meat.

In Cape Colony it is said that the old does are slaughtered to furnish meat for farm hands and young wethers are sold to butchers in the town. In California many miners purchase Angora wethers in preference to sheep wethers for salting down for winter use, because, as they state, the Angora contains less fat, is more easily kept, and is just as palatable.

John W. Fulton, who is much interested in exploiting the Angora goat industry in Montana and other parts of the Northwest, recently distributed Angora mutton to several prominent residents of Helena, and he has permitted the writer to copy a few letters which he received concerning the meat. The first one is from Hon. J. K. Toole, governor of Montana: "Referring to the Angora goat venison, which you were kind enough to send me, I am pleased to say that it formed a very satisfactory part of our Christmas dinner. We touched it rather gingerly at first through a sort of prejudice, but all agree that it was a very near approach to real venison."

This is from Hon. J. A. Ferguson, commissioner of the Bureau of Agriculture, Labor and Industry: "It is with much pleasure that I take this opportunity of expressing a very favorable opinion of Angora venison as a welcome addition to the usual meats upon a bill of fare. It is sweet, juicy and palatable—preferable to venison, pork, or mutton. A knowledge of the good qualities of Angora venison will surely lead to its adoption as a regular food, and it ought not to be difficult to develop a profitable demand for such a toothsome article."

And this from A. M. Holter, a prominent wholesale hardware dealer: "In reply to your inquiry will say that we have used Angora venison at our house on several occasions, and my opinion is that, when it is properly cooked, it compares favorably with mutton in every respect, and personally I prefer it."

Hon. F. D. Coburn, Secretary of the Kansas State Board of Agriculture, speaks in highest terms of Angora mutton.

Helena, Mont., Jan. 9th, 1903.

Mr. Jno. W. Fulton,

Secretary Montana Angora Goat Co., Helena, Mont.

Dear Sir:—It gives me great pleasure to express to you my favorable opinion of Angora meat, such as you were kind enough to send me, which I found to be very delicious and sweet when properly cooked, and will compare favorably with meat of like species. I see no reason why the meat of Angora goat should not

become popular, and believe it will when the animals are properly fattened and put on sale in the markets.

Yours respectfully, T. C. POWER.

Helena, Mont., Jan. 16th, 1903.

Mr. J. W. Fulton,

Secretary Angora Goat Co., Helena, Mont.

Dear Sir:—Some little time ago I had the pleasure of receiving from you a roast of Angora venison. I desire to express my appreciation of your kindness, and say that I found it very palatable. As an article of food I believe it to be quite satisfactory.

Yours very truly,

GEO. M. HAYS, Secretary of State.

It would not be a difficult matter to compile a thousand endorsements of the use of goat's flesh, but it would be difficult to find any one who would condemn it after using it. Opinions are given herewith of only a few of the representative breeders in this country:

From W. G. Hughes & Co., Hastings, Tex.—"The Angora is much more nutritious than sheep mutton, especially where the meat is grown on underbrush (leaves), as the following compilation of relative values of feed will show:

Character of Feed.	Protein.	Starch, etc.	Fats.
	Per cent.	Per cent.	Per cent.
Good pasture grass	3.5	9.7	0.8
Rich pasture	4.5	10.1	1.0
Leaves of trees	5.2	15.2	1.5
Red clover	3.3	7 0	0.7

"It is often prescribed by physicians for invalids and children for this reason. The meat is excellent, and not distinguishable from mutton of the same age and condition. It is largely sold as such in many of the larger markets, being regarded as a staple in the districts where it is raised."

From C. P. Bailey & Sons Co., San Jose, Cal.—"The young wethers make the best of mutton. The meat is rich and juicy and free from the strong taste so common to the meat of the common goat. I consider it equal to mutton. We have sold hundreds of head for mutton, always reserving the skins, which are worth green from 75 cents to $2 each."

From H. T. Fuchs, Marble Falls, Tex.—"Anybody who has ever tasted a roasted or barbecued piece of Angora mutton will

REGISTERED DOES AND FIVE YOUNG BUCKS.
On Ranch of W. G. Hughes & Co., Hastings, Tex.

L. of C.

find it better than any meat they ever tasted. Angora mutton is worth in the markets about the same as sheep mutton. I sell it to my neighbors at 4½ cents per pound, and in town I sell it at 5 and 6 cents per pound."

From George A. Houck, Eugene, Oreg.—"It is better than mutton, being free from the oily taste of sheep meat and partaking somewhat of the flavor of wild meat."

Angora mutton should be cooked longer than sheep mutton. If this is not done disappointment is almost certain. Well fattened old goats, if thoroughly cooked, may be made tender and palatable.

There is not much to be said about the flesh of the common goat. It is not so generally used as that of the Angora, and in quality is not to be classed with it. The kids of the common goats, however, are considered very fine, and in some parts of the South many grown animals are slaughtered.

Flavor of Angora Mutton.

A fact noted in connection with Angora mutton, if the goat has been fattened principally on brushwood and weeds, is that it has the game flavor common to the flesh of deer and other wild game. It is this flavor which has given the name "venison" by some to the flesh of the Angora. There is no reason to doubt the presence of this flavor, for it is well known that flavor may not only be fed into meat, but into milk and eggs as well. All game flavor disappears when the animals are fed grain and grass.

One of the first and most important questions that arises in the mind of one who may contemplate engaging in the Angora goat raising is, Is there a market for the products? The same question arises in connection with any other line of stock raising or commercial enterprise, and it must be answered satisfactorily if there is to be an investment.

Markets for Goats for Meat.

It can not be said at this time that there is or will be a market for goats as steady as that for sheep, for the reason that comparatively few have entered the regular channels of live stock trade; but it can be said that those which have been placed upon the market have been sold without difficulty. Usually the price has been a little below the ruling price for sheep, but it has frequently occurred at Kansas City (where most goats have so far been marketed) that a bunch of Angora wethers has brought more than sheep on the same day. This is where they are slaughtered and put upon the retail market as dressed mutton or used for canning.

The time will soon come when dressed Angora will be called for, and it will bring as good a price as mutton.

There is room now for the Angora as a meat animal. Cattle, sheep, and hogs are all bringing very high prices and Angora prices are high also, in sympathy with them. The live question just now, however, is not so much where to market them as where to get them. If the industry develops from the best breeding stock, with the purpose of mohair production in view, there will not be any considerable number to go upon the market for some time. Wethers are good mohair producers for seven or eight years; they may be then fattened for market, and then become excellent meat. The demand for a better quality of mohair will have a tendency to throw the poorer grade of goats upon the market as meat, but this quality will grow fewer and fewer every year. From the standpoint of mohair production alone, it would be a grand thing for the industry if three-fourths or more of the Angoras in the country at this time could be sent to the slaughter-house.

For some time to come, as in the past, many breeders will continue the practice of building up Angora flocks by crossing Angora bucks upon common does, and then upon the does of the first, second, and third crosses, and so on. The males resulting from such crossing must not be permitted to grow to breeding age. They should be castrated early, for they sometimes breed when very young. The only use to which such wethers can be put is to convert them into meat. The flesh from such crosses is considered to be nearly as good as that of the higher grades.

The Milk of Angoras.

The Angora is not primarily a milch goat and is not often employed for that purpose. Information at hand shows that the quantity of milk given by an Angora doe is uncertain, and in exceptional cases only does it approach in quantity that produced by the established breeds of milch goats, such as the Toggenburger, Saanen, Maltese, and Nubian. Evidently the reason why the Angora is so uncertain in milk production is because it has never been bred with that end in view. The established breeds of milch goats have become such after long years of careful breeding—the selection of individuals with specially developed characteristics. This is necessary to insure quantity, quality, and duration of lactation.

There appears to be no reason why the Angora might not be developed into a very fair milch goat if such a thing were desirable. But it is deemed wiser to charge the Angora with the duty of

producing a good fleece and raising a strong and healthy kid. When she does this, she does well. The hair on a good Angora covers the entire body alike, and thus it greatly interferes with the operation of milking.

In the Southwest, where the practice of crossing the Angora upon the common and Mexican does has been in vogue, it is said that a good milch animal is frequently produced. The milking strain is very apt, in such cases, to come from the side of the common or Mexican doe. It is stated upon the authority of some of the oldest breeders of the country that the likelihood of finding a good milch goat among Angoras diminishes as the grade of the animal is raised.

In this connection the remarks of William G. de Coligny, formerly a government officer of Ecuador (now of Springfield, Mass.), and one who had experience in that country with cross-bred Angoras and Nubian goats for milk, are full of interest. "The Angora goat in itself is not a good milch goat at all, but crossed with the Nubian, or Upper Egypt, goat, becomes quite a good milch goat." He states that from such crosses produced in Ecuador the daily yield of milk per head was about 2½ liters. The crossing of the Nubian and common goat of Ecuador produced a goat with a milk yield of 3½ liters.

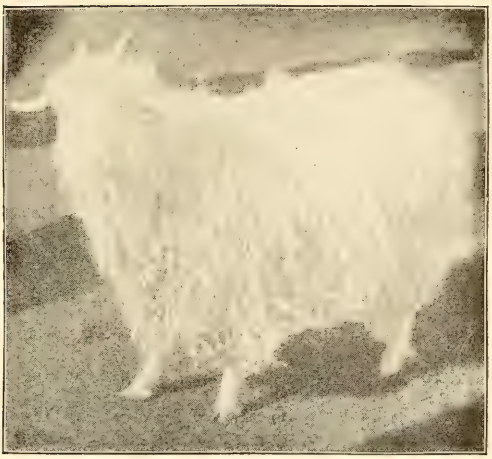
There is an abundance of authority that goat's milk is more nearly equal to human milk than that of any other animal, and that of the Angora is equal to that of any other breed of goats. An anlysis of goat's milk for the British Goat Society, with an analysis of cow's milk also for comparison, is shown in the table below. The cow's milk was from a cow which had been a winner at a dairy show:

COMPARISON OF ANALYSIS OF GOAT'S AND COW'S MILK.

Element.	Goat's Milk.	Cow's Milk.
	Per cent.	Per cent.
Water	83.21	87.56
Butter fat	7.30	3.63
Casein	4.18	....
Milk sugar	4.10	8.81
Ash	1.21	....
Total	100	100

The special reason why the milk of the goat is considered so beneficial is that it is not likely to contain the germs of tuberculosis. Bovine tuberculosis is so prevalent now-a-days that many people will not touch it if it is not sterilized. Goats are practically

immune to tuberculosis. It is true that goats will have this disease if they are inoculated with it, but they are not at all likely to contract it otherwise. The reader, if interested, is advised to read the discussion of tuberculosis in the chapter on "Milch goats."



CHAPTER VIII.

LOCALITIES ADAPTED TO ANGORA GOAT RAISING.

The Question of Climate.

So far as temperature is concerned, no place has been found that is too hot or too cold for Angoras. Although not partial to heat, they will endure it quite as well as sheep. Shade is essential to success if the sunshine is very warm.

The climate of Angora, where the breed originated and is still supposed to flourish in its more perfect state, is extreme. A temperature as high as 85° F. is registered in the summer and as low as 0° F. in the winter. The United States presents a wider range of temperature, where, in southern Texas and New Mexico, it may go above 100° F. in the summer, and in Idaho as low as 30° F. below zero in winter. The range of localities where Angoras have done well is from Guadalupe Islands, in the Lesser Antilles, to Ukamak Island, belonging to the Alaska Peninsula. M. L. Washburn, superintendent for the Alaska Commercial Company at Kadiak, says: "On Ukamak Island we have a flock of Angora goats, which have increased 60 per cent a year since they were placed there. They have given very good results in mohair, some of which is of good quality and fine texture." William M. Landrum is quoted as follows: "White goats can stand any amount of cold and snow, but sleet and wind are very injurious. On the other hand, they can endure the scorching heat of the Tropics. Their fleece is best at an altitude of from 3,000 to 6,000 feet above the sea level. The fleece never sheds on the Guadalupe Island, 210 miles from San Diego, at an altitude of only from 2,000 to 4,000 feet. I have grown mohair there 2 feet long, of lovely texture."

In considering Angora culture it is of importance to study the climate with reference to moisture rather than temperature. It should be remembered that the original home of the goat is high up in the mountains, where the air is not laden with moisture. Under like conditions it thrives best here.

It is a historical fact that the first effort to transplant the Angora goat outside of Asia was a failure on account of these condi-

tions. This was in 1554, when a few individuals were taken to Holland, but they soon died, owing to the moist climate.

The effect of climate has a great deal to do with the character of mohair. On this point John S. Harris, of Salem, Oreg., formerly of Oakley, Idaho, a gentleman of much experience, is quoted: "Mohair grown here in Idaho is very bright when scoured, and, owing to the electric currents which exist in the air, the hair possesses elasticity, a property requisite to mohair. Goats do not grow a long staple here, but, owing to the cold, it is very dense. Neither do they grow so heavy a fleece as in a milder climate, owing to the dryness of the air."

Col. W. L. Black, who is a writer upon Angora subjects, and whose experience as a breeder covers a period of thirty years and more, says that the Angora goat will thrive in any part of our country, and the yield of mohair will be greatest in the colder States. He estimates that the yield can be increased fully one pound by removing the goats from Texas to any of the Northern States. Since Colonel Black expressed this opinion, the Angora goat industry has spread into every State of the Union and has in most particulars confirmed his view. Some who have taken them into Northern States and met with losses have been inclined to ascribe their misfortune to the change in climatic conditions, but there is much room for doubt about this. The condition of the goats when shipped, the change in character of feed, exposure in many cases to severe weather, and possibly the development of disease, are more likely to have been the adverse factors than the mere difference in climate.

The Character of Soil Desirable.

Almost any kind of soil, except wet and marshy land, is suitable for these goats. Their preference is mountainous or rocky land, where they find it necessary to climb hillsides and cliffs to browse. Such situations not only afford them the most apparent satisfaction in climbing and feeding, but the rocks serve to trim the hoofs, which is a matter of importance; for on soils devoid of rocks and coarse sand the feet must oftentimes be trimmed by hand.

One thing which is essential to successful goat raising is pure drinking water, and no place affords this better than the springs and rivulets of hilly and rocky localities.

It must not be understood, however, that rocks and hills are essential, though they afford the ideal to the goat. Some of the best goats in this country are on valley lands. As stated above, almost all kinds of soil are suitable except wet and marshy land.

Goats are not partial to water in any form—in the soil or as rain, snow, or sleet—and they drink a very small amount. It is well to remember that Angoras must be kept dry overhead and underfoot.

Goats are as subject to foot rot as are sheep, and this is one reason why they should not be kept on wet soil. Such a locality has a deleterious effect on the mohair also.

Land Available for Goat Raising.

The character of land first suggested as being available for goat raising is that part of many thousands of farms which is already thickly covered with brushwood or which is gradually becoming covered. All through the Eastern and Southern States fields which were once in a high state of cultivation are now covered by a dense growth of brush and briers. Only the most vigorous application of the grubbing hoe and the torch prevents the brush from taking every cultivated acre. In some places there may be seen corn furrows made so long ago as to enable pine trees a foot in diameter to grow up in them since. In the lumber regions the removal of the trees gives an impetus to the underbush, which soon becomes an intolerable nuisance. So there are, in Michigan and Wisconsin especially, thousands and thousands of acres of "stumpage" which are the best of soil and which, when the brushwood is removed, may be converted into the best of pastures for other live stock. These are the available lands which the Angora goats are now feeding upon; for they are giving a double return to their owners by clearing up the farm and by producing mohair. There is enough of this kind of work to engage the attention of the Angoras for several years.

Besides the kind of land mentioned above, there are millions of acres of rough mountainous land which are densely covered with brushwood, and which, in present condition, are of no economic use. Much of this land, if cleared of brush, would become seeded by natural methods to blue grass, and thus become good pasture land for other live stock. Much of it, too, is useful for nothing else than goats; grass will not "come in" after the goats. If the goats are removed after it is once cleared, brush will follow again. All of this mountainous land will in time become pasture for millions of head of Angoras.

Capt. Almont Barnes, in an article entitled "Keeping goats for profit," makes some estimates of the amount of unimproved land in the country, basing his calculations upon the reports of the Eleventh Census. He finds that the total amount of unimproved land in the United States is 265,000,000 acres. In Maine

SCENES ON E. D. LUDLOW & CO.'S RANCH, LAKE VALLEY, NEW MEXICO.

there are 6,000,000 acres in farms, of which 3,000,000 are improved; in Georgia are 25,000,000 acres in farms, of which 9,500,000 are improved. He concludes: "There is, however, in the United States a large, continuous area, embracing over one-third of the States and Territories, which invites particular attention in connection with this subject. It includes the South Atlantic and South Central divisions and a part of the Western division of the Census groupings, or twenty States and Territories, which together contain nearly 285,000,000 acres in farms, of which over 122,000,000 are improved and over 162,000,000, or 57 per cent, unimproved. The average size of farms and the average amounts of unimproved land are greater in this area than elsewhere, and the climatic conditions are more uniform."

To give a detailed description of all this land mentioned by Captain Barnes would require several large volumes, and can only be mentioned in the briefest manner here.

Few of the people living in New England or west of the Allegheny Mountains realize how much of the land area of Maryland, the Virginias, the Carolinas, Tennessee, Louisiana, Mississippi, and Georgia is still in virgin forest or how much is in brush and briers where good fields once were cultivated. That land which has "gone back," or grown up with brushwood and briers, is very cheap. There is an increasing interest in Southern agriculture, and the States mentioned are even now welcoming back the Angora goats to their first American homes to do the work which is so expensive for man to do. Without the Angora, it may be a century before these millions of acres will yield anything useful to mankind. With him, they are soon converted into fields, pastures, and orchards.

Piedmont Virginia has considerable forest land, with many varieties of oak, hickory, poplar, cedar, chestnut, pine, and other timber trees. Of oak there are at least seventeen different varieties. Most of this area has been cut over, so that there is remaining no considerable amount of mercantile timber. In several places, however, manufacturers are finding it profitable to work up the younger growths into spokes, handles, headings, staves, etc., and it is claimed that the pine, locally known as "old-field pine," possesses large capabilities for utilization in the manufacture of paper pulp. What is said of Piedmont Virginia may be said of Piedmont Carolinas and eastern Tennessee. Much of this region is already producing, in its northern part, some of the finest apples in the world, and, in its southern part, peaches that are of first quality. The railroads here, as elsewhere, are doing what they can toward the development of this waste land. Readers who may

be interested are advised to write to the Land and Industrial Agent of the Southern Railway, Washington, D. C., for detailed information concerning available land in any of the States mentioned.

The conditions obtaining in the stumpage districts of northern Michigan are flattering for the Angora industry. Angoras have already been tried there, and they do well. As far north as Sidnaw, Houghton County, Mich., W. S. Prickett has a considerable number, as well as a thousand Shropshire sheep. E. C. Anthony, of Negaunee, Marquette County, in the same State, is also succeeding with goats. Information concerning every feature of this section may be obtained from the Land Commissioner of the Duluth, South Shore, and Atlantic Railway, at Marquette, Mich. E. W. McPherran, the present Land Commissioner, furnishes for this book the following description of the Michigan peninsula, under date of December 8, 1902: "In Ontonagon County, especially in the territory between the east and west branches of the Ontonagon River and east of Lake Gogebic, the country was originally taken up and covered by homesteaders and large lumbering companies. After the pine had been removed from these lands by the various parties in interest, fire broke out in the slashings at different times during the last fifteen years, and up to six years ago fires literally swept that territory bare.

"The town of Ewen, situated upon the middle branch of the Ontonagon River, is in the midst of this burned-over district, and the land on all sides of the town slopes from the south to the north and from the east and west down to the middle branch of the Ontonagon River. The surface of this country is generally fair and rolling with almost no bad spots in it. The soil is a good strong clay and clay loam. There is left upon this land but little green timber, and that is in the low spots and along the streams and water courses where a little cedar and hardwood can be found—enough to afford material for fencing and ample protection to stock.

"As soon as the fire stripped the country of its timber, it became covered anew with second growth—hardwood, poplar, birch, etc.—and between the stumps and logs there sprang up a strong growth of natural grasses, mixed here and there with patches of timothy along the old logging roads and clover and timothy near the camps, the seed being dropped, I presume, from horses and from hay brought into the lumber camps.

"Col. L. D. Burch, of the American Sheep Breeder, made a recent examination of this territory and wrote me a long letter in which he expresses himself extremely delighted with the whole

situation and says that there is in this vicinity going to waste annually natural pasturage enough to feed several thousand head of cattle and a million sheep and goats.

"Another stretch of territory admirably adapted to goat raising extends west from Lake Gogebic and runs through what was originally a heavy hardwood and hemlock country. The land is a first-class clay loam and in many instances has been cleared either by fire or the lumberman's axe. Clearings, when they have not been immediately subjugated, become covered with a strong growth of young shoots, and, as the land is well watered and rolling enough to afford splendid drainage, it has always seemed to me an ideal country for the growth of sheep and goats.

"After crossing the Montreal River, the boundary between Michigan and Wisconsin, one strikes another such tract of land as there is to be found in the Ontonagon valley with a somewhat similar soil. This country runs as far west as the village of Marengo, Wis., and possibly farther, and is contiguous to the D. S. S. & A. Ry., being evenly distributed on either side of the track.

"I would also call attention to the country in Houghton and Baraga counties directly back of Baraga on Keweenaw Bay. In this vicinity a large number of German and Swedish farmers have settled and have made their mark, as they always do. Here one finds a nice tract of country, the slope being towards Keweenaw Bay on the east. The soil is clay and clay loam, and the growth of grasses and all roots crops is remarkably rapid.

"At Sidnaw, Mich., Mr. W. S. Prickett has on what he calls his 'Roycroft Farm' a herd of Angora goats and also about 1,000 registered Shropshire sheep. At Low Moor in Marquette County Mr. E. C. Anthony, of Negaunee, Mich., has had good success in raising both sheep and goats.

"The territory just south of the village of Newberry, in Luce County, is another desirable location for the pasturage of goats. This country was stripped of its timber by the Newberry Furnace Company while in operation at Newberry, the timber being then used for fuel and kiln wood. The land around Newberry is a sandy loam with a slope from the south to the north and drainage into the Tahquamenon River. There are some 5,000 or 6,000 acres of this land almost entirely destitute of timber.

"In the Ontonagon valley there are perhaps 35,000 acres of land suitable for the pasturage of goats; between the head of Lake Gogebic and Marengo, Wis., possibly twice that amount.

"This land can be bought at varying prices—that at Newberry for about $2.50 per acre; that at Ewen for from $3.50 to $6, and

GOATS AT WORK ON FARM OF W. S. PRICKETT, SIDNAW, MICH.

that between Marengo, Wis., and Lake Gogebic for about the same figures."

So far as the lumbered-over condition is concerned, northern Wisconsin is much the same as northern Michigan. A bulletin (No. 88) recently issued by the Wisconsin Agricultural Experiment Station deals with the agricultural features of this section, and the statements given herewith are from it. Goats are to be considered, in most parts of our country, as the forerunners of sheep. They destroy the brush and weeds, fertilize the soil, and the grass which follows and which they are not likely to disturb becomes the best of pasturage for sheep or cattle. "One great advantage which this region possesses that has been forcibly shown, especially in recent years, is that a clover crop is rarely subject to failure. In the southern counties the snowfall is often so light that clover winter-kills, and it is therefore difficult at times to secure luxuriant pasturage and maintain the fertility of the soil. In the central and northern counties this has never yet happened, and the result is that these highly nitrogenous forage crops can be raised in great abundance. This region is preeminently a grass region, wild grasses growing in the greatest profusion, while the domesticated grasses, like timothy, red top, and Kentucky blue grass, are introduced with the greatest ease. This can be seen even in the primeval forests where timothy and clover spring up in the 'tote roads' wherever the sunlight is let in through the cutting of the timber. Not infrequently timothy reaches a development of five feet in height."

The great adaptability of the soil of this section for clover and grasses makes pasturage perfect. Many men of means have recently started large stock farms in this hardwood belt, including some of the most prominent breeders in the country. Land is not very high in price. Whoever may desire further information should address an inquiry to the Land Commissioner of the Wisconsin Central Railway, Milwaukee, Wis.

Central and northern Minnesota are offering great opportunities for goat farms. Angoras are now being employed there by many farmers for clearing brush land, and the demand for them is rapidly increasing. The purpose is to have sheep follow the goats.

The forest trees alone, says Prof. Thomas Shaw, would tell to an experienced eye the tale of the character of the land. Much of the forest is hardwood, comprising such varieties as maple, birch, hemlock, and in the lower lands elm and basswood. Large areas at one time grew straggling pines of good size, with more or less frequency, among the hardwood trees. Other forests are of

the grove order. They are composed of small trees, all or nearly all of the hardwood varieties, and they grow so closely that they crowd one another for existence; and yet again are stretches where pines only grew. But these, compared with the whole area, are not large, except in Oneida County in the neighborhood of Rhinelander and northward from that place. But in some other areas of Wisconsin the pine stretches are extensive.

The kind of pasturage that is produced after the timber and brush are removed is shown in the following from Professor Shaw: "No sooner has the forest been cut away and fire has done its work in removing the encumbering timber and brush than the blue grass and white clover spring up like magic and take possession of the land. Where they come from so quickly, nobody seems to know, but they come, and they come to remain forever. If the bird and the winds could speak, they would probably tell us something about whence they come. Their rapid growth suggests the thought of spontaneous generation, which is, of course, impossible. But their coming so quickly and growing so luxuriantly calls up the thought of the high adaptation of the country to those grasses. Even in trails in the forest they grow and flourish, where they must needs struggle for the light. This abundant growth not only furnishes fine pastures, permanent in character if desired, but their presence is an assurance that here is a land with high adaptation to a great variety of crops. In such a soil mixed pastures also permanent in character, and containing many varieties, can undoubtedly be grown, but the need for these has not yet been felt by the settlers."

The "Soo" Line Railway is taking a special interest in the development of the lands described above, and any one who may be interested should write to the Land and Industrial Agent of that line, at Minneapolis, Minn. The increasing interest in the live stock industry of the country and the proximity of these lands to the great Chicago markets make them very desirable to many seekers for new homes.

One of the things which has long been a menace to New England prosperity is her great number of abandoned farms. The soil "ran out" and the weeds and briers "came in," while the owners sought new homes, perhaps in the West. The situation appeared hopeless until Angoras were introduced and began to demonstrate their usefulness in rehabilitating these farms, by exterminating the brush and calling back the grass. There are not yet many goats in New England, but good reports are made of the work of those which are there. Land is cheaper nowhere in our country than in this section. The Angora industry can not

fail to make good progress here, for they have here the feed and the markets.

In Oregon, Washington, Idaho, and Montana there is an abundance of available land. The Angoras have been tried in all these States and proved to be a successful venture. Seekers after locations should correspond with the secretaries of the several boards of agriculture. In Montana the grazing question is receiving attention, and it is entirely probable that other Western States will be considering the relative value of grazing land for goats; for it must be remembered that, while goats prefer brushwood and weeds to grass, they will eat grass and thrive on it if confined to it. Besides, there are good mohair growers who believe that the quality of the fiber is improved if the goats have a diet largely composed of grass.

The following letter from C. H. Hales, of Eugene, Oreg., contains matter of interest to any one who may think of engaging in the Angora industry in Oregon. Practically the same conditions obtain throughout a large section of that country: "I have my goats in the Cascade Mountains in what is known as timber land, and I am satisfied that, by clearing up the underbrush with goats, it will not only make fine range for cattle, but will be the means of stopping our forest fires. The timber land here is not poor soil, but very rich. I have raised clover four and five feet high and timothy over six feet high on this mountain land. There are thousands of acres of this land now being taken as timber land under the Timber and Stone Land Act. It is the richest land we have.

"My goats are fat, and I am of the opinion that it is not good policy to keep them on browse alone. I have not had a sick goat during the year, while a friend of mine who insisted on keeping his on brush lost several head with scours."

The Ozark region, which embraces practically one-fourth of the south and southeastern portions of Missouri, and extends over a considerable portion of northern Arkansas, is peculiarly adapted to Angora goat raising. The soil of the major part, especially in Missouri, is what is known as limestone land with a clay subsoil. The surface is high and rolling, in many places broken, almost mountainous in character. The altitude is from 1,200 to 2,000 feet. There is ample rainfall, something over 40 inches in a year, which is ample for the production of all horticultural and agricultural products which are raised farther north. The land is all covered with timber; the valuable portion has been cut off in most places, leaving an undergrowth which ranges from 4 to 30 feet high. Black, red, white, and bur oak predominate. In some

ANGORAS ON PLACE & HOOVER GOAT RANCH, ROLLA, MO.

sections there are cedar and pine, also some hickory, walnut, and elm; in fact, all hardwood species are said to appear in these forests. Nearly every quarter section has permanent living water upon it. Tame grasses of all kinds do well here after the timber has been cleared away.

In addition to the favorable conditions for the goat, it is well to have consideration for his master. This is a section whose apples, peaches, plums, pears, and cherries, as well as small fruits of all kinds, grow abundantly. The country is favorably located as to markets and railroad facilities, yet the land is very cheap, ranging from $1 to $5 per acre for unimproved land and from $8 to $15 for that which is improved.

A. B. Hulit, Springfield, Mo., general manager of the Frisco Live Stock Company, is much interested in the development of this Ozark region, and will answer any inquiries concerning it.

CHAPTER IX.

THE CARE OF ANGORA GOATS.

The Question of their Hardiness.

There has been a great amount of careless writing about Angora goats which has given the widespread impression that they are very hardy. This is, indeed, true to some extent. The crosses upon common goats are very likely to be hardy, and it may be stated, as a general rule, that the higher the cross becomes the less hardy is the animal. Schreiner, who probably knows more about what the original purebred Angora goat was than any other authority, says: "I think it is certain that the original was a small, very refined, delicate animal." The fact that the best mohair goats in the United States at this time are nearly all of this description lends much weight to his opinion. Our breeders may sometimes produce a large, hardy animal which will produce the best of mohair, but such an ideal is not yet in sight.

In many instances during the recent rapid spread of this industry, the careless or shiftless man has presumed upon the reputed hardiness of the Angoras and has subjected them to all manner of discomfort and deprivation, apparently with the expectation that final results will be fully as satisfactory as if rational attention had been given them. While he would not think of putting a horse, or cow, or hog upon its own resources in a pasture in winter where the snow is a foot or more in depth, he has done so with his goats and then wondered why they did not thrive, for had he not been told that "they will live on nothing"? Now, it is true that many flocks pass through a winter and thrive well where the snow is deep and the temperature very low, but they get something to eat every day, and plenty of it. Let the keeper of Angoras use common sense in handling them and he will not be disappointed.

Given adequate shelter and feed such as they relish, Angora goats will show that they have the ability to withstand both extreme cold and extreme heat. They thrive in Alaska and also in Guadalupe Island. The same ability to withstand extreme temperatures is exhibited by horses, cattle, sheep, and hogs, which argues more for care than against climate. (See remarks on climate in the chapter on "Localities adapted to goat raising.")

Angora goats can subsist upon vegetation which is utterly useless for any other purpose, but this is only evidence of their economical keeping; it does not authorize one to conclude that they never need any other kind of feed. The purpose of speaking of the hardiness of the Angora goat here is to impress the fact that, if satisfactory results are to be obtained—indeed, if disaster is to be avoided—the animals must receive the same rational treatment that is received by other live stock when best results are sought. In the sense that domestic animals are hardy, the Angora goat is very hardy, but this characteristic is of service only so far as it enables him to respond the more quickly and satisfactorily to rational handling.

Shelter and Pens.

A shelter is necessary during wet spells, and more especially if the rain is cold or in case of sleet storms. Dry cold alone has little or no injurious effect after the kids are three or four weeks old, and they will even frolic in the snow when the mercury is at zero, and sleep with apparent comfort in an open shed. With their dense covering there is no reason why this should not be true; but this same dense covering when soaked with cold water or driven full of sleet, is a deadly menace. Goats will not get wet if they have an opportunity to avoid it. They appreciate a shelter and will always seek it at night, and during the day in the event of storms. They are said to be excellent barometers, being able to foretell stormy weather, and always contrive to place themselves under shelter before the advance of a storm, if possible. Mr. Diehl says they will run miles to avoid an undesirable rain.

Goats should not be left on the range or in pasture over night. The latter is practiced to a considerable extent, but experience has shown that they are safer in closer confinement during the nighttime.

The pens in which the goats are kept at night should, above all things, be in such a location that they can be kept dry by drainage. Other live stock should be excluded, as they would only help to trample the ground into mud. They should have a dry place to stand and sleep, for they are apt to contract rheumatism in the knees. There would be little use in raising Angoras for their fleeces if they are compelled to wade through mud and filth or be confined under these conditions. The fleece would soon become so soiled and matted as to be a "burden unto death."

The sheds provided for their shelter must be of a size to give an abundance of room. The goats should not, under any circumstances, be huddled together. If they are thus crowded in cold

Bred and owned by
James A. Moberly
Windsor Ill.

weather they will pile up, with the result that some of the younger ones will die from suffocation. One writer states that he has known as high as 30 being killed in this manner in one night. Oscar Tom, of Angora, Oreg., describes a shelter that proves satisfactory, in the following language: "The sheds should have eave troughs, and be boarded down to within 3 or 4 feet of the ground. There should be a ditch around the shed to prevent any water from running into it, and it should be open all around, so that the goats would not have to wait for others ahead of them to go in; a few cross ones could not block the way and keep other goats in or out, and the rain would not blow in, but the goats would have plenty of fresh air. There should be a good fence around the shed at a distance of at least fifty yards, to keep cattle and horses from trampling up the ground and working it into mud. Have the fence high enough for the goats to go under, but never allow hogs to run into the goat shed, for goats are easily frightened after dark."

The ditch referred to will fill up very rapidly with dirt and manure, and should receive constant attention. If it is not kept perfectly clear it may as well not have been made.

In some parts of the country the strong winds will blow rain under a shed such as Mr. Tom describes. In such cases, the side from which these storms usually come might be boarded to the ground. A better plan, in the opinion of some, is to have a few solid movable panels of fence to place around the openings of the shed on such occasions. This plan is convenient, too, as the panels may be taken away in fair weather, thus permitting a free circulation of air from all sides.

Shelter from the sun's rays should be provided for summer time. Although goats are able to withstand intense heat, they do not thrive well when subjected to it. For this purpose sheds more open than that described above are preferred, for the reason that the air will have freer circulation. Better yet than a shed against the suns' rays are large trees. In this case there is no obstruction whatever to the air.

Herding and Fencing.

Goats require a great amount of exercise, much more than sheep. The one is by nature a browser and the other a grazer, and the browsing habit naturally requires more activity on the part of the goats. They are sensitive to restraint and do better if not herded, but, of course, this is often a necessity, and therefore should be done under as favorable circumstances as possible. So far as possible they should not be allowed to feel their restraint.

If constant attendance is necessary, the herder should be of quiet disposition. The next best thing to the freedom of a range is a large pasture, where the goats may have oversight, but not constant attendance. Such pastures are considered the cheapest method of keeping these goats. They can easily be trained to come home by feeding a little and salting regularly.

The fencing for pastures is a matter which early concerns one who contemplates going into the business, for it is the current belief that goats will climb onto any shed of ordinary height or jump any fence that will stop other animals. While they will climb anything that is built in such a manner that it may be climbed easily, they will not jump any ordinary fence. They will, however, creep through if there is an opening large enough. The old-fashioned "worm" fence, especially if it leans outward, will not stop goats. The angles in such a fence are an incentive and a delight to them. Indeed, there are many hogs that will go over a fence of this kind.

The writer knows of an instance where an effort was made to keep goats inside a stone wall; but the alert animals found a stump near the wall at one point and from that jumped upon the wall, then walked nearly half a mile on the top of this, and then found a stone outside which assisted them down. He has also seen goats lie flat on their sides, as pigs are prone to do, and crawl under a woven-wire fence. These instances are related here as warnings that, while goats will neither jump nor tear down a fence, they require a well-made one. They accept every opportunity offered to climb or crawl.

In constructing a goat fence there are other matters to be taken into account than simply that the goats should be kept in; the animals themselves, especially the young ones, must be protected from predatory animals, such as dogs and wolves. Too much dependence must not be placed upon the goat to defend itself, especially in the dark. It often occurs that dogs and wolves do their worst work at night, when the goats are without an attendant, and they frequently go upon their forays in groups of two or more. The greatest cunning and generalship is exhibited by the "sheep-killing" dog. In the Southwest it is much more important to fence to keep varmints out than it is to fence to keep the goats in. So the double object must be kept in view in building a goat fence. Such a fence must be dog-proof, hog-proof, and wolf-proof. A hog at liberty which has had the taste of chicken or lamb or kid is a greater nuisance than any wolf or dog, and should be dispatched as being an enemy to other young live stock as well as kids.

Any material which is usually employed in the construction of fences is suitable for goat fences. The manner of construction is the important feature. If the purpose is to clear land of brushwood in order to convert it into pasture land, the fence should be made with permanency in view. A fence of ten-barbed hog wires, with posts set twenty feet apart, and having three stays between, is a very good one. The lowest wire is only 1 inch from the ground; the next four wires 3¼ inches apart, and one-half inch added to every space above the first below it. It is necessary that all wires should be kept taut. In the Southwest these barbs inflict wounds upon wolves and dogs which try to get through them and the screw worm infests the wound and death ensues. Goats are wise enough to let the wires alone.

A good fence may be made of woven wire three feet high, drawn on the inside of posts, and a closely barbed strand of wire 3 or 4 inches above fastened to the outside of the posts to prevent animals from jumping in. In hilly or rolling localities some difficulty is met in fitting the fence to the contour of the ground. Sometimes there must be filling under such a fence where it crosses over a depression. This must not be overlooked, for the goat will astonish you, if you do not attend to these places, by lying flat on its side if necessary to crawl through. C. P. Bailey & Sons Co., say: "Nearly every one has a mistaken idea about fencing pasture to hold goats. One man says, 'Make your fence hog-tight, horse-high, and bull-strong.' Probably this man had a few pet goats that had become experts at getting out of pastures. A good fence three feet high is amply sufficient to hold goats. Three boards, with two barb wires, or a 24-inch Page woven wire fence, with three barb wires above, will hold goats without liability of escaping. Several of the corrals at our Nevada ranch are made of 36-inch De Kalb wire fencing, with one barb wire at the top. These corrals keep goats in and coyotes out. The barb wire on top prevents cattle or horses from breaking down the fences."

A straight rail fence, if the rails are laid close together, as well as an ordinary board fence, will turn goats; but a zigzag, or worm, fence is no sort of barrier to them. A stone fence has to be well built to prevent their climbing it.

A goat would rather sleep on top of a barn than anywhere else below, and if it is possible for him to get on a roof he will do it. It is not necessary to state that their presence there is ruinous to the building.

GROUP OF ANGORA KIDS. Property of J. S. Moberley, Windsor, Ill.

The Question of Feeding.

The principal reason why goats will prove to be more profitable in some places than sheep is because they are practically inexpensive so far as feeding is concerned. This phase of the subject is quite fully discussed in the chapter on "Browsing and pasturage." The goats eat the leaves in summer and the soft twigs in winter, and if there is an abundance of either they will not need much of anything else to sustain life. It is not possible in all localities, however, for goats to get twigs in winter, and therefore some other provision is necessary.

Corn fodder is a very good feed and is relished if there is no browse to tempt the goats away. They are also fond of clean straw. There is not sufficient nourishment in these fodders, and some grain should be fed to keep the animals in good condition. Probably the best feed is oats, and if it is sheaf oats it is better still. In Texas cotton seed is often fed by scattering it upon the hard snow, where goats will have to exercise somewhat to pick it up; besides, the time consumed in picking it up insures better mastication.

Reports from some goat men who have run their goats upon cowpea stubble in the autumn are of the most satisfactory nature. That which goats pick up would otherwise be good as fertilizer only, and it puts them in prime condition, in a very short time, for breeding and for winter. Cowpea hay, clover hay, and alfalfa hay are all most excellent coarse feeds, and with them no grain is necessary to carry goats through the winter in fair condition.

In feeding grain care must be taken not to make the supply too liberal, unless the object is to be fattened for slaughter. Goats easily become lazy on a plentiful supply of grain and will decline to go out to feed upon the brush. This is an important ponit, as their hardiness, to a large extent, is attributed to their feeding upon browse and to the resulting exercise. The quantity of food necessary to keep goats in good condition varies according to the climate, but one-fourth pound of corn or its equivalent in other grain and 1¼ pounds of hay at a ration is about a fair average. With abundant winter pasture this ration once a day (in the evening) is sufficient; if the pasture is scant, they ought to have it both morning and evening, and on wet cold days, when they are kept in the sheds all day, feed them three times or make their rations correspondingly larger. In feeding either hay or grain, absolute cleanliness must rule, as goats will not eat soiled food. There is no animal more particular about his food than the goat. He has no inclination for mud or filth in which to stand or walk, much less having to pick his food out of it. Bryan Hook, author

of "Milch Goats and Their Management," says: "The goat is of all animals the most fastidious in the matter of the cleanliness of its food, refusing, even though ever so hungry, to eat food that has been soiled or trodden under foot. For this reason a rack should be provided for the hay, and only as much given at each meal as the animal will consume, for that which has been trampled under foot will ever be rejected, even though carefully collected and replaced in the rack."

When the production of mohair is reduced to a fine art, the question of feed in addition to browse will receive the most careful attention because of its influence upon the fiber. With this thought in mind, the reader is advised to see what Dr. McMurtrie says, as quoted in the chapter on "Mohair and mohair manufactures."

Wet Grass Considered Injurious.

The Angora goat breeders of Asia Minor attribute the healthfulness of their animals, as well as the excellent quality of mohair produced, to the very dry climate. They believe that moisture, even in the form of dew and sleet, is injurious and often fatal to the goats, and are very careful not to allow their flocks to go to pasture until the grass and other herbage is dry. While this view may be exaggerated, many of our breeders follow the Turkish practice with excellent results.

The Question of Watering.

Goats do not drink much water, but what they do drink must be clean. They have an inherent abhorrence of filthy water and filthy food. A running stream is a valuable thing in a pasture. If that is not present, water from a spring or well should be afforded.

The Question of Salting.

Goats require more salt than sheep, owing to the more astringent character of their feed. If loose salt is used, the general custom is to give it once a week on regular days. If rock salt is used, it should be placed where the animal can get to it at any time. Rock salt is preferable, as it can be placed in boxes or troughs raised from the ground, and thus be kept out of the dirt and be of easy access to the goats at any time; and, too, there is no waste and do danger that the animal will eat too much of it.

The Question of Marking.

The question of marking is always proper. Several devices are in use, but the metal tag in the ear is probably best known.

A practice which appears to give satisfaction is to tattoo the numbers into the ear, using indelible ink. It is found that the metal is sometimes pulled out by the brush.

Kidding and the Kids.

The kidding time is the most important in the life of the goat. For two or three days after the kids are dropped they are exceedingly delicate, and there will be no future success unless good care is given at this time. They can not "rough it" at this period, but will die from very little exposure or neglect. They are more delicate for a few weeks than lambs. When the kids are large enough to follow the flock they have constitutions stronger than lambs of like age and are able to care for themselves very well.

The proper time for kids to arrive is in the spring, about the time when leaves start on the trees and bushes. At that time there is milk-producing food for the doe, and the weather is also warm enough to favor the kids. The exact time may be governed, of course, by the service of the bucks and will be earlier in localities where the seasons are earlier. If the kids come in cold weather, there will be greater difficulty in saving them. Warm stabling must also be provided, and the does will require extra feeding in order that they may supply milk for the kids.

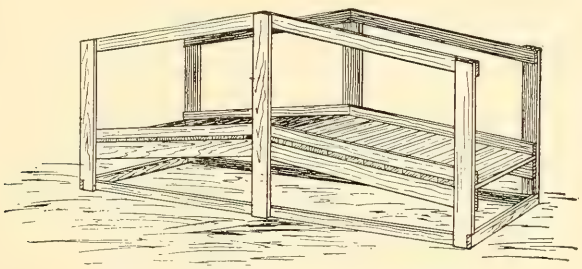
A few days before a kid is due the doe should be separated from the flock. Some breeders would put her in a pen alone, while others would put as many as 20 in one pen. If the facilities are at hand, a small pen for each doe is better, for the reason that the doe will sooner "own" the kid and there will be less danger of injury than if among a number. A doe knows her kid by the sense of smell, especially when it is young. This characteristic is so strong that some breeders assert that if two kids of different mothers are rubbed together, the does will often refuse to own them. Whoever cares for the doe at kidding time will find it an important part of his work to see that the does own their kids. This difficulty in any case will disappear in a few days, and it will then only be necessary to arrange for the does to get to the kids whenever they desire.

If kids are dropped on the range or in the pasture, they must be carried home and special care given to see that the does are made to own them, for many times they will refuse. A lamb will follow its mother very soon after it is dropped, but a doe will hide her kid as best she can in the bushes or behind a stone or log and leave it there while she goes away to feed; and on her return she expects to find it where she left it.

The Mexican method of handling the kid is largely practiced

in Texas and New Mexico and consists of "staking," or "toggling," the kid. When the kid is dropped, take it to a protected place (shed or barn), seeing to it that the doe follows, and "stake it out," or "toggle" it, with a string about 14 inches long. Tie this string to one leg, changing occasionally to the other legs to avoid lameness. This string should have a swivel in it to prevent twisting, and the kids should be carefully watched so long as they are so tied, which will be from seven to ten days.

The does should remain with the kids until they leave them of their own accord to go out for feed. The kids may then be allowed to run loose in a pen together until they are large enough to go out with the flock, which is when they are from four to six weeks old, or when they are able to jump a board from 12 to 20 inches high placed across the gate. The height of this board this method in Nevada for more than twenty-five years. If the restrains the kids that are too small to follow the flock and at the same time enables the does to go and come as they please. W. G.



THE HUGHES SEPARATING BRIDGE.

Hughes & Co., of Hastings, Tex., have a device for separating the does from the kids which is better than the board. It is a bridge, either end of which drops to the desired height. This device enables the does to go out and in without injuring the udder, which is apt to occur where they have to jump a board.

The following is from Dr. W. C. Bailey, one of the best-known breeders in the world: "There are in use two methods of handling kids at kidding time; namely, the corral method and the staking method. Each of these has points which render it most valuable under certain conditions and in certain localities.

THE CORRAL METHOD.

"This method may be used with any number of goats. With various modifications and adaptations which best suit the size of the flock, the climatic conditions, the facilities for feeding, etc., it may be used by the beginner with success. We have practiced

herd is a large one, say 1,000 head, three men are required to handle the goats at kidding time. The service of the bucks is so managed that the kids will be dropped gradually through several weeks. At the height of the season we expect from 75 to 100 kids a day. The season lasts about thirty or forty days. Fortunately, most of the kids are dropped in the daytime.

"We have four or five small corrals, fenced with 36-inch woven wire and large enough to hold 50 does and their kids. The doe should be allowed plenty of room, because if too close to her neighbor she may adopt the other doe's kid. Besides, these small corrals, two large ones are needed, each large enough to hold 1,000 does. Along the fence of one of these corrals are a dozen small pens just large enough to hold a doe and kid. At the gate of this corral a jump board is placed. This jump board is intended to keep back those kids which are not large and strong enough to jump over it. A 2-inch board about 18 inches high will answer the purpose. Another device sometimes used is a platform open at the end, so that the kids may run under it and thus avoid being trampled upon when the goats are going out over the paltform.

"The small corrals may be made of panel fence and located in a meadow where some feed is afforded. The does should always have some kind of feed at kidding time.

"In the morning the flock is carefully examined, and all does which show signs of kidding during the day should be separated and placed in one of the small corrals. The large flock is now turned out, and one of the men is sent with them with instructions to take the herd at once as far as he intends to go for feed that day, then to let them feed over a limited area and gradually work their way home. A few does will drop their kids on the range, and the herder should carefully note the number and their location. He should see that the herd does not feed around one of these does, as she is apt to leave her kid and join the band, thus necessitating much extra work in finding the kid and in giving it to its mother. Early in the afternoon the band is placed in one of the large corrals. Now the herder and another man go out with a wagon or on foot and carry the kids home, gently driving the mothers. The kids should not be handled or rubbed against one another more than is necessary, as the doe knows her kid by the scent. These does and kids are placed in the small corral which contains the does held back in the morning with the expectation that they would kid during the day. We now have one day's kidding in one of the small corrals. The does and the kids should be watched to see that they are properly arranged. Do not bother them more than is absolutely necessary. Do not be

SHOWING ANGORA BUCK BEFORE AND AFTER SHEARING. Buck is owned by J. S. Moberley, Windsor, Ill.

in a hurry to make a doe own a kid. Do not drive the goats around one of the small pens.

"The does should remain with their kids in the corral for a day or two at least, or until the kids are properly mothered. Any does which have not kidded should be taken out. The next morning any kids which may have been born during the night are put in another small corral with their mothers, as well as the does which are expected to kid during the day. The procedure of the previous day is repeated. In about three days, if one has limited quarters, the first day's mothers and kids may be put in the second large corral; that is, the one with the jump board at the gate. Now this 'wet' band is placed in charge of one of the men and sent out to feed. The gate is opened, the mothers passing out over the jump board, and the kids remain in the corral. The herder must not range his goats near the does that are kidding upon the range, and he should be cautioned to come in later than the 'dry' band, so as to avoid any possibility of their mixing. When his band arrives at the corral the gate is opened, and each mother hunts for her kid. Some of the kids may not find their mothers, and if after a day or two there are a few unnourished kids and some does with overdistended udders they should be placed together in the small pens along the side of the corral. The doe will own the kid in a day or two, whether she is its mother or not. The kids should not be allowed to become too weak before this is done. If one does not have enough small pens, a doe may be held while two or three kids suckle her, and thus tide them over until some of the small pens are vacant.

"The next day the second day's kidding is added to the wet band. The wet band thus gradually grows, while the dry band decreases. During the day two men will be employed at herding the dry and wet bands, respectively, and the third man will be kept busy inspecting the kids, feeding the does in confinement, etc. If the weather is stormy some of the kids will have to be sheltered. The advisability of having the kids dropped gradually through a period of thirty or forty days will readily be seen. If help is inexperienced they may be gradually trained, or if the weather is stormy there will be time to get all things arranged properly.

"The kids should not be allowed to go with their mothers until they are about six or eight weeks old. If they go before this, they will probably become tired very soon and go to sleep. When they awake the band will have gone, and they are liable to be lost. During the day, while the mothers are feeding, the kids would eat a little grass if they could be herded near the corral.

"As stated before, there may be many modifications of this

method which will suggest themselves, but the above is a general outline of a method commonly in use.

THE STAKING METHOD.

"This method is largely employed, even with large flocks, in New Mexico, but is possibly best suited to small flocks. It is without doubt the best method for certain surroundings. About the same amount of help will be required as with the corral method. There should be a good supply of stakes similar to tent stakes. There should also be a supply of swivel blocks which are about 4 inches long and having a hole bored near each end. A piece of rope about 6 inches long is fastened to the stake, and the other end is passed through one of the holes in the swivel block and a knot tied in the end. Another piece of rope of equal length is likewise knotted and passed through the other hole of the swivel block, the loose end being tied to the kid's leg. Any swivel will take the place of this primitive method. The herder or owner can busy himself during the winter months by making stakes and swivels and by cutting and attaching the ropes.

"When a kid is born it is taken to a convenient place to stake and the mother is gently coaxed to follow. The stake is securely driven into the ground, and the kid fastened to it by the hind leg. The mother is left with the kid, in order that she may know where to find it upon returning from feeding. The kid should be staked where he can get plenty of sunshine, shade, and shelter. A small bush, a post, or a box will answer the purpose admirably. If there are twins, they must be so staked that they can suckle at the same time. The rope should be changed from one hind leg to the other occasionally, to prevent unequal development. Sometimes a vigorous kid gets thoroughly tangled and requires help. The kid may thus be staked until he is old enough to go with the flock, which is after six or eight weeks, or he may be put in a corral a few days, as is done in the corral method.

"There are many successful breeders who use this method entirely. One may expect to get good results if he follows either the corral or staking method carefully."

There is very small loss among kids cared for as set forth above. Many of the breeders on a large scale report the percentage of increase as 100. This does not mean that every kid lives, but that so few die that the loss is offset by the number of twins that are dropped. The most practicable fencing to be used at kidding time is made of portable panels. By the use of these panels a pen may be made large or small and be moved from one place to another without difficulty and with very little work.

Weaning.—Kids should not be weaned until they are 4½ months old unless they are very strong; but they should not remain with their mothers after they are 5 months old. This especially applies to the buck kids, as they will often breed at 6 months of age or even younger.

Castration.—The buck kids not reserved for breeding purposes should be castrated when about 2 weeks old. The earlier it is done, the better will be the meat and the mohair. It is pointed out in previous pages that the mohair from wethers ranks with that from the does, and the flesh is superior to that of the does and inferior only in small degree to that of the kids. A cool day should always be selected for the operation of castration and careful attention given for a few days.

Notes on Kidding from Correspondents.

As kidding is the most critical period in the handling of goats, it is very important that the breeder, especially if he is a beginner, should be well informed on this matter. It therefore seems desirable to quote herewith the various views of men who are successful and well-known breeders.

From F. O. Landrum, Laguna, Tex.: "There are several methods of handling goats during kidding. The one employed here is the Mexican plan. When the kid is dropped take it by the hind legs, so that the doe will follow, to where you want to stake him. Stake with rope about 12 inches long, with wooden swivel in center. Leave them staked until after they are marked and castrated and well owned by the mother. Sometimes kids are herded with their mothers and sometimes by themselves until they learn to be herded. If not handled properly and the kids are allowed to mix together, the doe loses the scent of her kid, and young does will often disown them."

From W. G. Hughes & Co., Hastings, Tex.: "We keep the nannie and kid to themselves so far as possible for a day or so, and do not allow more than 20 nannies and kids in the same pen until the kids are over a week old, nor more than 50 nannies and kids in the same pen until 2 weeks old. Kids are kept in the pen day and night until a month old, and are then allowed to run outside the pen during the day to eat a little; the feed may be furnished them in the form of cut branches if there are no bushes near the pen. They should also have access to water after 4 weeks old. When 6 weeks old they can go out with the flock for a few hours in the afternoon, the flock being brought in at midday for this purpose. After 8 weeks they can go regularly all day with the

get through kidding time is to put all the does that are soon to bring kids in a separate small pasture where they can be looked up easily. In case of bad weather they should be brought into their shed every evening before sundown; but if the weather is dry and not too cold they can be left out, and all the does will likely own their kids. Of course, the kids will not follow their mothers as lambs do, but will lie down in a thicket or under a bush, a weed, a log, or a rock, and remain there till the mother comes back to it, even if it should have to wait till it starved to death; but after a kid is a few days old it is able to follow its mother, although it is best to keep the kids at home. Kids need not suck oftener than twice a day."

From Josephus R. Barnette, Globe, Ariz.: "I cut out the heavy ewes from the rest of the herd, and hold them in a close herd, and catch the kids and bring them with their mothers to the corral, where each kid is staked separately with a toggle, or swivel, being careful to see that the mother knows where the kid is. After this I let the new mothers come and go at will, only noticing them enough to see that they come to their kids regularly. The kids should be watched closely in order that they may not get tangled up and hurt. When they are about 2 weeks old they are turned loose in a corral and a board is put at the gate over which the mothers jump in going to and from their kids. When the kids are 3 months old they may be allowed to go with the herd."

From Col. Wm. L. Black, Fort McKavett, Tex.: "This is the most critical period in the handling of goats. The kids are generally collected daily, as soon as dropped and able to stand and suckle the mothers, and are confined in a corral for several weeks, much of the time tied to a stake driven into the ground. It is not safe to let them run with the flock until they are a month to 6 weeks of age, as they are liable to drop out of the flock and be lost."

From H. I. Kimball, Maxwell City, N. Mex.: "I always keep the kids in a corral until they are old enough to follow the doe, which is when they are about 30 days old. In taking the kids to the corral care should be taken to get nothing on them that will change the scent, for does are very sensitive. If two kids from different does are rubbed together, the does will often refuse to own either of them. All kids should be castrated before 2 weeks old, as there is less danger and they do not get so sore."

From G. M. Scott, Malta, Idaho: "Take all the nannies out from the other goats as soon as they kid, and put them by themselves. I have about 100 small pens in which I put the nannies. Put the young nannies and old ones in different pens. Here they

flock. We use a bridge for the purpose of 'cutting back' such kids as should not go out with the flock."

From H. T. Fuchs, Marble Falls, Tex.: "The easiest way to remain for 4 or 5 days and they are then turned into a larger pen, but not more than 50 should be put together."

From Oscar Tom, Angora, Oreg.: "I aim to have a field of fall grain or reserved pasture to turn the does in a few days before kidding commences, and turn the does in another pasture as fast as they drop their kids. Keep the kids up about 2 weeks, then let them go with their mothers."

From Henry Fink, Leon Springs, Tex.: "I stake the kid in a barn for 2 weeks. The mother goes out in the daytime to feed and is put with the kid at night. After 2 weeks the kid is turned loose and kept in a pen until 2 months old, when it is allowed to go out with the flock."

Care of the Feet.

The toes will grow to a great length and turn up at the points, like an old-fashioned skate, if they are not trimmed. They will not only thus become a nuisance to the animal, but will get sore and become very painful. Where the goat has the run of rocky land or land that is sandy to a considerable extent, hand trimming will not be necessary, but if for any cause the toes grow too long, they should be pared off with a knife.

If the soil is wet much of the time, the animals are liable to be attacked with foot rot. For treatment of this disease, the reader is referred to the chapter on "Diseases and other enemies."

CHAPTER X.

FLOCK MANAGEMENT.

The Best Flock.

It is assumed that whoever goes into the business of raising Angora goats will do so principally for the production of mohair, rather than meat or skins, and therefore it is to his interest to possess a flock that will yield a profit from the beginning. The best flock for this purpose is one composed of high grades, or thoroughbreds. (There are no purebred Angora goats, so far as any one knows.) Such a flock will produce good mohair from the first. There is a great difference between high-grade goats—in length, strength, luster, density, and fineness of fleece. The better these qualities, the higher will be the price.

Whoever enters upon this industry will shape his plans to conform to his capital, just as he would do in any other business. If he begins with high-grade does, they will cost him from $5 to $15 each, and the prices of good bucks range from $20 to $100. Exceptionally excellent bucks, especially winners in the show ring, will bring higher prices. A large flock of this kind of animals, although preferable, would cost a small fortune, and so be beyond consideration by the greater number of people who will engage in the industry.

A Flock from Small Beginning.

A plan that may be pursued by one who has limited capital is to begin with a few first-class animals and from these build up a flock. The result is quite sure to prove satisfactory. This may be the wisest plan for the beginner to follow, as experience, which is so necessary to success, will be gained as the flock increases. The mohair from such a flock will bring a good price and the kids are far more profitable than crossbreds.

Crossing Upon the Common Does.

It is observed in a previous chapter of this book that many years ago the Turks began the practice of crossing Angora bucks upon Kurd does. They had in mind the twofold purpose of producing thereby a hardier animal than the purebred Angora and

of increasing the number of goats in order to supply the increased demand of Europe for mohair. The practice of crossing Angora bucks upon common does in the United States began at once upon their introduction, and the results have been satisfactory in that the industry was thereby saved to the country. It is probably a safe statement that if our supply of Angoras had depended entirely upon importations and their offspring, there would be nothing here now worthy to bear the dignified title of industry.

Most of the large flocks of the Southwest had Mexican does for their foundation, but it is a most encouraging sign of the times that the practice is not followed any more except to a limited extent. The country has no further need of such crosses, and it is desirable that the practice cease altogether. The advantage claimed for crossing upon common does is that good does may be purchased at $1.50 to $2.50 each; that during the first and second crosses there are many twins, thus increasing the flock in that proportion—a condition not existing, except to a small extent, among the highest bred Angoras; and the size and hardiness of the progeny are increased and the liability to disease decreased.

Care should be exercised in starting a flock by this method to select only such common does as are entirely white; any other color, however slight, is objectionable. There should be no dark spots on the skin. The offspring from such animals might prove satisfactory, but the probabilities are to the contrary. In handling crosses, the breeder finds that atavism, or reversion of type, often becomes apparent when it is most objectionable.

It is also necessary, in order to insure best results, that the common does should have as short hair as it is possible to obtain it. This hair (known in the Angora fleece as kemp) will be correspondingly short in the crosses. Crosses upon long-haired does will oftentimes exhibit kemp from two to four inches long. This means a heavy shrinkage in noilage when the mohair reaches the manufacturer.

The buck used upon these does and upon all the crosses should be the best one can afford. A poor buck will defeat the object of the breeder. It must be remembered that the excellence of mohair which is in view must be contributed entirely by the buck. All male crosses for many generations (a dozen would not be too many unless kemp should disappear) should be castrated and prepared for slaughter as soon as large enough.

The building up of a flock of Angoras by the practice of crossing upon common does is not so rapid as many suppose. Let it be assumed that we have a flock of 100 common does which drop as many kids the first season. Half of these are bucks, leaving

ANGORA GOATS ON RANCH OF PHILO OGDEN, UPPER LAKE, CAL.

50 does for the next cross. These 50 drop 50 kids, 25 of which are does; the next cross would give 12 or 13, and the fifth cross 6. This last number represents approximately the number of high-grade does that would result each year from a flock of 100 common does at the beginning.

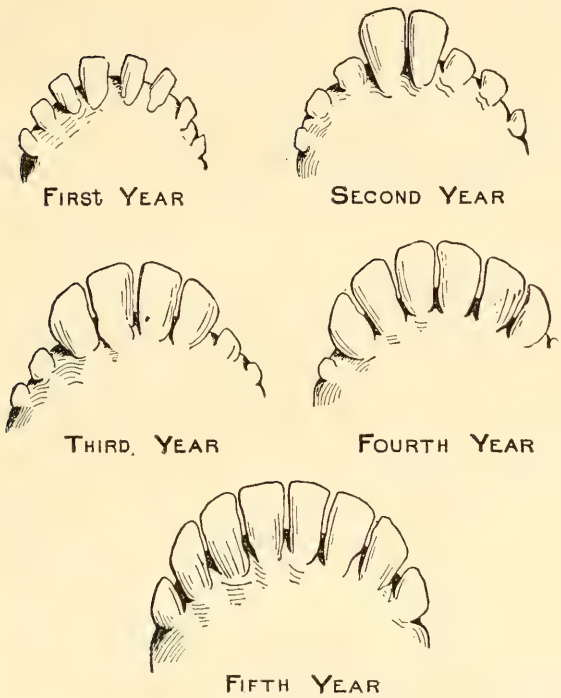
I have spoken of the fifth or sixth cross as being high grades, and so they are; but they are far, very far, from being purebreds, and it is probably giving them too much credit for excellence to call them thoroughbreds. A purebred Angora should not have any kemp whatever. How long time may be necessary to produce a kempless Angora from crossing upon common stock no one will venture to say. Instances have been reported where kemp was still in evidence after twelve crosses.

While the purpose of the above paragraphs is to tell why crossing upon common stock is resorted to and how it is done, it is a practice to be discouraged at this time. The Angora goat breeders are just now doing their utmost to produce kempless animals, and this crossing is persistently working against their purposes. Every drop of common blood adds trouble extending over many years.

Proper Age for Breeding.

Goats of both sexes will sometimes breed when they are 5 months old, and often at 6 months, but from the fact that they are at this age but a month or two from weaning time and are not nearly full grown, it is obvious that they should not be permitted to breed. They reach maturity when about 16 or 18 months old, and they ought not to breed before this time. If bred earlier the kids will not be so strong or so well developed. They are in their prime when from 2 to 6 years old, but with proper feeding in winter they have been known to breed regularly until 15 years old. The average life of goats, however, is about 12 years. There should be no tendency to keep does until they are very old unless they bring kids of exceptional merit, for it must be remembered that their mohair gets coarser, and consequently less valuable, as they grow older. Old does make very good mutton if fattened on grain, or if a good portion of their feed is grain. The cooking requires a little more time than for young animals.

The accompanying illustration shows how the age of goats may be determined until they are four years old. After that, in the absence of definite information, the age is a mere matter of guess, based upon the general appearance of the animal. The new teeth are longer and larger.



THE AGE SHOWN BY THE TEETH.

In-and-In Breeding.

In-and-in breeding means the breeding of related individuals. The term is indefinite, and with some refers to a close relationship and with others to any degree of relationship. Extensive correspondence with the goat raisers of the United States shows that with them the term means generally the breeding of individuals of close relationship.

There is an overwhelming sentiment against the practice because of the injurious result to the constitution of the offspring. It is quite generally agreed, however, that in-and-in breeding will produce a fleece of finest fiber, having beautiful luster and little oil, but the weight will be reduced. The few who favor the practice contend that the quality more than offsets the quantity. The offspring of related animals are not so large and strong as those which are not related; they are quite delicate and naturally more subject to disease. The fact must not be overlooked, however, that John S. Harris, of Salem, Oreg., has followed in-and-in breeding continuously and with evident success, and, too, they are

kept in a climate where the temperature in winter is sometimes far below zero. But Mr. Harris is a gentleman who understands the art of breeding. If all goat raisers knew so well the principles of breeding as he does, there might not be so many to condemn the practice. However, they have learned much by experience, and it can not be contended that they are wrong in advising generally against the practice.

Management of the Buck.

Bucks usually come in heat about the middle of July and continue so about six months; does, however, do not usually come in heat until the latter part of August or the first of September. As the period of gestation in goats is from 147 to 155 days (or about five months), care must be taken in mating the animals to have the kids dropped in proper season, which will vary somewhat with the locality. The kids should not come before the warm days of spring or when vegetation begins to put out vigorously. Therefore the buck should be put to service from November 1 to December 1, so that the kids will come about the first of April or May. The only objection to earlier kidding is the extra care required to preserve the life of the kids, for they are exceedingly delicate for a few days, as has been stated before, and even a little cold at this season will probably prove fatal.

A buck, like any other domestic animal, should be in the best possible condition when put to service. He should be well fed with grain for a few weeks before this time, and the feeding should be kept up until a few weeks after his service is ended.

As to the number of does which a buck may serve, there is a great diversity of opinion. The greater number of goat raisers, however, think 40 or 50 is all that may be served with good results. Col. Richard Peters wrote that he had obtained the best results with 200 breeding does by turning in with them ten selected bucks. His object was to have the kids come as nearly at one time as possible, thus shortening the period of careful watching. Referring to Colonel Peters's practice, Dr. J. R. Standley says he regards it a great success, and will adopt it in the future. He says, further: "I have tried the one-service system, also turning in bucks at night, removing them during the day, and other plans, but decidedly prefer Colonel Peters's plan."

Where there are very large flocks it is not always desirable that the kids should all come at one time. If they are dropped at intervals for a month, one attendant may thus be enabled to look after a large number, whereas if all come about the same time, one attendant could not do the work, and assistants who may be

strangers to the flock would be necessary. (It is not well to have many strangers with these goats at any time, and certainly not at kidding time.)

The handling of "riginals" (ridgels) should have a word here. If the one testicle which descends is removed, the riginal will not get kids, but he will bother the does. If the descended testicle is not removed, he will breed without difficulty. He should be killed as soon as practicable.

Number of Kids.

Thoroughbred Angora goats do not generally drop more than one kid at a time, while the common goats nearly always drop two or three. There are many twins with the first cross, but the number of twins diminishes as the crosses become higher. It is stated that the purebred Angoras never dropped but one at a time, and that the presence of twins in a flock is evidence of a base origin of the goats. The latter statement is disputed by some, who believe that the purebred Angora (having no trace whatever of base blood) will drop twins as regularly as the common goat. This is a point that is liable to remain in dispute, as there is no way to settle it.

In the Southwest, where most of the large flocks are located and where no particular care is given the goats on most ranches, the average percentage of kids is about 70. In other places, where such care is given the does at kidding time as they ought to have, the increase may easily be 100 per cent. There are instances of the increase reaching as high as 120 per cent. Good handling of a flock anywhere ought to give a kid for every doe of the flock.

Size of Flocks.

All goat raisers agree that Angoras can not stand crowding together; and the higher the grade of the goats the more susceptible are they to injury from crowding.

Special stress should be laid upon this matter of crowding, for it is more serious than many people will be inclined to think. They will argue that goats ought to stand what sheep and hogs do in this respect, but the fact is they will not stand it. Let no one crowd his animals, and be convinced of his error when he finds a half dozen dead ones in his goat shed some morning. Goats require much fresh air and it must be afforded them. Many who have taken goats from the South to the North have worked injury to their flocks when attempting a kindness by providing barns too warm, without sufficient ventilation. For well-fleeced goats dry barns are needed more than very warm ones.

To state just how many should be kept in a flock is difficult, as the number depends upon the character of their restraint. Where they have the range at day and large yards at night, the flocks may be very large, but where they have pasturage and small pens at night the flock must not be large. It is stated by some that goats in small flocks shear more than those running in large flocks. A flock ought not to exceed 2,000 in number.

Dehorning.

Dehorning the goats has received very little consideration, and it is probable that Q. M. Beck, of Beargrove, Iowa, is the only goat raiser who is now practicing it. Many other breeders report that they do not dehorn but believe it practicable, while a very few express opposition to the practice. Mr. Beck writes as follows: "I dehorned 45 head last fall (1899) and found it a success, as it stops a great deal of bunting, which is liable to cause abortion, saves shed room, saves broken legs, and will save many kids." These same reasons have brought the dehorning of cattle in quite general favor among breeders, and it is probable that as the Angora goat industry grows into a large industry the practice of relieving the goats of their civilized weapons of warfare will be generally adopted. Mr. Beck dehorns in the fall after all flies are gone.

A different view of the question of dehorning is taken by C. P. Bailey & Sons Co., who dehorned 250 head which were in a band by themselves. They bunted as much or more than before the horns were removed. "Goats always butt each other, but we have never seen any ill effects resulting, except occasionally a leg being broken from being caught between the horns. It deprives them of their only means of defense, and we consider it unnecessary and objectionable."

CHAPTER XI.

SHEARING, SHEARS, AND SHEDDING.

Shearing Once or Twice a Year.

In Texas, New Mexico, Arizona, and sometimes in California shearing is done twice a year—in the months of March or April and in September or October. The reasons for this are that the fleece will often shed in the fall as well as in the spring, if it is not clipped owing to the long warm season. H. T. Fuchs, of Texas, says: "I find it quite necessary to shear twice a year, as they suffer too much from heat in the summer and autumn and even during the warm days in winter if they are not sheared about the middle of September, and in the springtime as soon as they begin to shed their long silky hair." There are occasional instances in these localities where goats carry their fleece through the year, but all breeders, except in some parts of California, report the practice of shearing twice a year. In the other parts of the country shearing is done but once a year, and that in the months of March or April. The rule for shearing time does not depend so much upon the calendar as upon the condition of the fleece. It should not be delayed until the fiber begins to shed, as then the oil will begin to go back into the body of the animal, the mohair thus losing its life and luster. After goats once begin to shed, the loss of mohair is considerable. A bit of the fleece may be caught upon a twig or thorn or silver and be pulled out. When the hair is not shedding the goat is very careful about its hair, for it gives pain to have it pulled; but when it is shedding the skin itches, and every effort will be made to rid itself of the fleece.

As to the relative values of the semiannual and annual fleeces, there does not seem to be much difference of opinion. The semiannual fiber is shorter and therefore less desirable for fabricating, and the price is not so high as for that of the annual fleece. It is generally agreed that the two shearings combined weigh a little more than the annual shearing, but probably the increase does not average more than a quarter of a pound. However, some who have practiced it report that the gain is not equal to the cost of the second shearing, and that shearing twice is done from necessity rather than from the standpoint of profit.

It is well to keep in mind the fact that our mohair manufacturers have never yet been able to secure all the long staple that they needed, but at the same time the market has always been overstocked with the shorter staple. This is especially true of the mohair which is not over four inches in length. Much of the semi-annual shearing is not so short as this and so brings a better price in a more certain market.

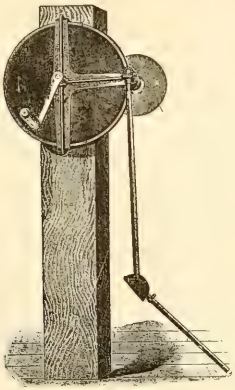
Use of Clipping Machines.

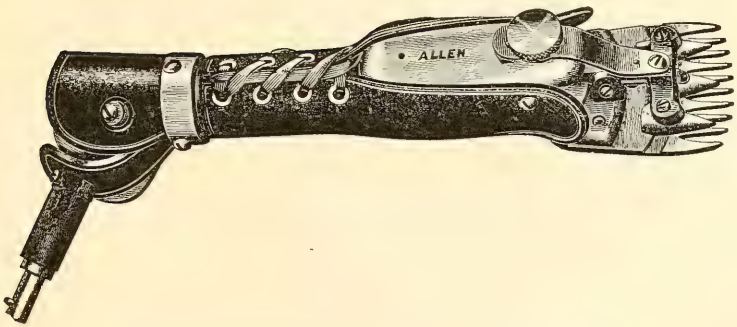
The use of clipping machines, although largely employed among large sheep raisers, has not yet come into general use among goat raisers. Those who have used them indorse them, and they will no doubt soon come into general use. They are more rapid than hand work, and the results are more satisfactory. The cutting of the skin is easily avoided in reasonably careful hands, while it requires extreme care with hand shears to prevent cutting. Mr. H. I. Kimball, of New Mexico, says of the use of the machines: "I sheared them [the goats] myself faster than the best hand shearer I ever saw, and I got a better price for my mohair." Another gentleman says: "I will say that the clipping machine for sheep will work well on goats in every respect. I have sheared ten goats in one hour and done up the fleeces." The power machines may operate any number of shears, all of which are connected with the driving shaft. The same machine, with one pair of the same kind of shears, is made for operation by hand power. A man or a boy of good strength may easily operate this machine, while another applies the shears to the goat or sheep. The machine is not expensive, and goat men generally will find it to be to their advantage to use it.

Of course, the goat raiser will consider the relative cost of shearing with machines and by hand before he will purchase a machine. The decision will probably depend upon the number. The cost of hand shearing is about 4 cents a head. In the Southwest there are Mexicans who follow the profession of shearing sheep and goats; these usually receive 2 cents a head with their board. Many of them will shear 85 or 90 a day, the average of all being about 60. Any man who can shear sheep can shear goats. If shearing is done by hand, a short-bladed shear should be used in order to avoid cutting the hair twice.

Another objection to hand shearing is that there is often double cutting of the hair. The results are a shortening of the fiber and an increased amount of noilage.

The shears used for goats, both hand and machine, are the same as those used for shearing sheep. It is much easier for the



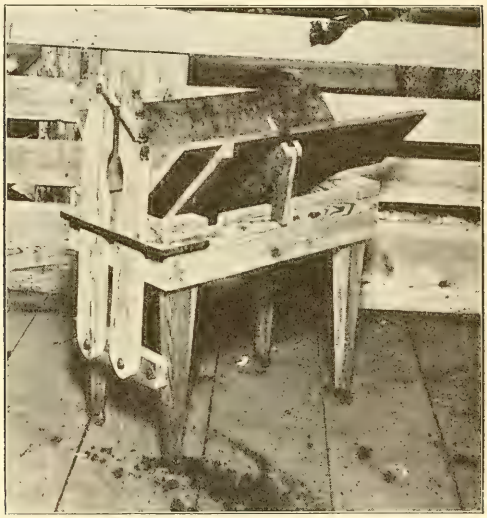


POWER AND HAND SHEARING MACHINES.
Manufactured by the Allen Sheep Shearing Machine Co., Chicago.

shearer and more humane to the goat if the shears are always sharp.

The Operation of Shearing.

Goats are not so gentle in the hands of the shearer as sheep, and many, especially among beginners in the industry, are anxious to know how best to handle them during the operation of shearing. The illustration presented here is of a combination shearing trough and table, and was devised by F. W. Ludlow, of Lake Valley, N. Mex. This table is very simple and is equally suited to



LUDLOW COMBINATION SHEARING TABLE.

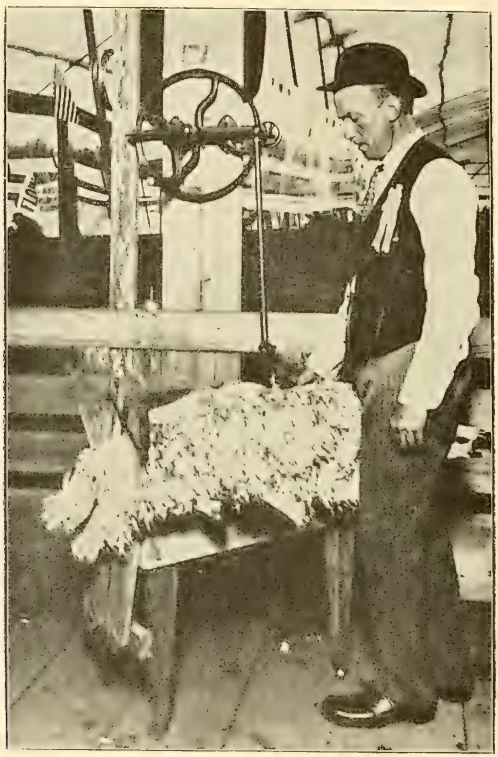
hand and machine shearing. It is first used in the shape of a trough. The goat is placed in it on its back and held down by means of an iron yoke across the throat. While in this position all the underparts, sides, and legs may be worked upon. Mr. Ludlow says that in machine shearing it is a good plan to start at the brisket and shear all the belly as far back as possible; then shear the front legs and neck; then start at the hocks and shear up the hind legs and along the sides to the point of beginning. After shearing one of the sides allowed by the trough, the goat is tied—"hog-tied," to use a Western expression; that is, all four feet are tied together. The sides of the trough are now dropped, forming a table upon which to finish the operation. The illustration shows that there is now free access from the tail to the head, and the goat remains helpless. In the illustration the fleece already cut has

been pulled away in order that the table might be shown, but the proper course is to leave all the fleece upon the table until the goat is liberated, and then roll it up inside out.

Mr. Ludlow's description of this table is given herewith: "The table is simple in construction. It is about 22 inches high, 2 feet 10 inches long, and 21 inches wide. The top is composed of two

9-inch sides, which are hinged to the 3-inch centerpiece. On the lower side of these movable flaps is a narrow piece 8 inches long, which catches on the framework of the table when the sides are lifted and holds them stationary. When the sides are elevated, the top of the table forms a trough 3 inches wide at the bottom and possibly a foot wide at the top. Into this trough the goat to be shorn is thrown feet up. A small iron yoke, which is attached to the end of one of the sides, is placed over the goat's neck and fastened to the other side. The goat's head is hanging over the end of the table and the yoke prevents it getting free. The belly

and legs are then shorn. The legs of the goat are then tied together, the yoke removed from the neck, and the sides of the table dropped, so that one has a plane surface on which to shear the rest of the animal. An untrained man can shear 100 goats a day with a shearing machine and such a table." Since Mr. Ludlow wrote the above, a Mexican in his employ sheared 226 goats in eight



hours and fifteen minutes on this table. This stands as the world's record for goat shearing.

Washing the Goats Before Shearing.

If the animals have been well cared for through the winter and early spring, it will not be necessary to wash them before shearing. And yet it is next to impossible to have a flock where all or any considerable number of them are clean enough to shear without washing, and it will be time and money well spent to put them through the water. Most goat men do not wash their goats before shearing and this is the reason why so much very foul mo-

GOAT CLIPPING MACHINE.
Manufactured by Chicago Flexible Shaft Co., Chicago.

SHEARING PLANT, USING STEWART SHEAR.
Made by Chicago Flexible Shaft Co., Chicago.

hair is thrown upon the market. Some goat men, like many sheep men, harbor the foolish notion that the mohair buyer is going to pay them just as much for their dirty mohair as for that which is comparatively clean. On the contrary, they are liable to be offered less than it is really worth.

Care of the Fleece After Shearing.

The operation of shearing should be done in a building free from straw and dirt, which might adhere to the fleece after it drops from the goat. It should then be rolled up, inside out, and packed in the sack without being tied in any way. This is the manner in which the mills desire to receive it. The practice of tying the fleece with almost any kind of twine that may be at hand obtains very largely among goat raisers in the United States, but not with those of Turkey and Cape Colony. The reasons why the mill operators do not desire fleeces tied are very forcibly stated by one of them (George B. Goodall), as follows: "I want to mention another evil which should be corrected, and that is the use of twine or string around the fleeces. Vegetable fibers will not take dyes used for animal fibers, and in cutting these strings by the sorters more or less of the vegetable fibers get into the mohair and have to be carefully burled out from the face of the finished goods, which adds to the cost of each piece. A mohair should be simply rolled up without twine of any description. You never see it on Turkey or Cape mohair."

Previous to the year 1902 the manufacturers complained bitterly of the practice of many shippers of mohair tying fleeces with all sorts of dirty and frowsy twine. Some even used baling wire; and the instances were not rare where stones and clods weighing several pounds were found in the sacks. These were no doubt placed there to make additional weight, and they did; but the mohair buyer does not pay the freight, neither does he buy without careful examination of every sack, so the loss falls directly back upon the shipper. For the year 1902 the mohair buyers of American mohair state that there have been no flagrant efforts at fraud by such schemes.

After the fleece is taken from the goat, it should be spread out upon a clean table, as stated before, and all foreign particles carefully removed. The fleece is apt to contain straws, pieces of briers, burs, and sometimes even cockleburs, and all these should be taken out before the fleece is rolled up. While this procedure is necessarily tedious and to some may appear useless, it will pay. This work must be done somewhere, and wherever it is done the mohair producer pays for it either directly or indirectly. As labor

HAND AND POWER SHEARING MACHINES.
Manufactured by the Cooper Shearing Machine Co., Chicago.

on the farm and ranch is cheaper than that in the mills, it would better be done there.

Some have adopted the practice of baling their mohair instead of using the old-fashioned sack; but the baling is not so satisfactory to the manufacturers as the sack, and it will therefore probably not be generally adopted.

The Question of Shedding.

The question of shedding is not now provoking so much discussion as it did two or three years ago. There were a few breeders who maintained that purebreds and thoroughbreds would not shed their coats under natural conditions; there were others who asserted that they would shed biennially; others who maintained that the matter of shedding and nonshedding was a question of feed and care and still others who stoutly affirmed that it is perfectly natural for the Angora to drop his fleece annually, and when he does not, it is the exception, not the rule, which obtains. This last view is rapidly coming to be generally accepted by the breeders; at the same time, they acknowledge that there are some individuals that carry their fleece two years. This characteristic of the individual, however, is not believed to be applicable to any particular strain; it is only an incident.

As a rule, Angora goats, like sheep, shed their fleece annually as soon as the warm weather of spring opens up. In the Southern States, it is found that they will shed twice a year, and it is for this reason that semiannual shearing is practiced there.

CHAPTER XII.

DISEASES AND OTHER ENEMIES.

Goats are less subject to a variety of diseases than sheep, yet there are some diseases that appear to affect both alike. The two animals are so closely allied that treatment for disease is about the same for both.

Stomach worms (*Strongylus contortus*) affect goats as readily as sheep. They are also found in cattle and deer. In discussing this disease, the attention of goat raisers is called to some experiments conducted in Texas only quite recently by Dr. Ch. Wardell Stiles, then zoologist of the Bureau of Animal Industry. As this is an important and somewhat extensive disease, and as great care is needed in proper treatment, Dr. Stiles is quoted somewhat at length as follows:

"Sheep, goats, and cattle suffer from the effects of roundworms. This is especially true during wet years. These parasites are found particularly in the lungs, the fourth stomach, and the bowels, and, when present in large numbers, they may result in death of 5 to 50 per cent of a flock. For some of these parasites treatment is possible, but for others treatment has not been found altogether satisfactory.

"Roundworms which live free in the fourth stomach or in the bowels may be expelled by using various drugs in drenches. A long list of medicines might be mentioned, but many of the drugs most highly recommended frequently fail to effect a cure. Failures are due to several causes: The drug itself may be of little or no value; it may not be administered in the proper dose; it may not be administered in the proper way.

"One of the most commonly used drenches is turpentine, but more satisfactory results are obtained from the use of coal-tar creosote, or coal-tar creosote and thymol or gasoline, or bluestone.

"I have had excellent success in treating sheep, goats, and cattle for the twisted wireworm (*Strongylus contortus*) with a 1 per cent solution of coal-tar creosote. The medicine is easily prepared and quite inexpensive. It may be purchased of the druggist in small quantities of 1 ounce or in pound bottles. One ounce is sufficient for about 20 adult sheep, and the cost of the treatment is less than

one-half a cent per head; if creosote is purchased by the pound, the cost is reduced to less than one-quarter of a cent per head. If creosote is called for at a drug store, beechwood creosote will usually be dispensed. This is more expensive than the coal-tar creosote and not so satisfactory in expelling worms.

"A 1 per cent solution of coal-tar creosote is made as follows:

Coal-tar creosote	1 ounce
Water	99 ounces *

"Twisted wireworms (*Strongylus contortus*), taken directly from the stomach of sheep or cattle, die in one-half to one and a half minutes when immersed in this solution.

"If, in dosing, this liquid enters the lungs the animal may succumb in a few minutes. If the dosing is performed carefully, as much as 6 2-3 ounces may be given to a full-grown sheep without fatal results. In some cases, however, the animal shows ill effects, from which it usually recovers within half an hour. Six ounces were given to a number of sheep without the slightest ill effects. The following table gives the doses of the 1 per cent mixture which were used in about 400 cases without ill effects:

Lambs 4 to 12 months old	2 to 4 ounces (about 60 to 120 c. c.)
Yearling sheep and above	3 to 5 ounces (about 90 to 150 c. c.)
Calves 3 to 8 months old	5 to 10 ounces (about 150 to 300 c. c.)
Yearling steers	1 pint (about 480 c. c.)
Two-year-olds and above	1 quart (about 960 c. c.)

"Sheep, goats, and calves which received this treatment showed a marked improvement a few days after receiving a single dose.

"In experiments with creosote at Washington, D. C., sheep were drenched with a 1 per cent solution and killed immediately afterwards. Upon opening the fourth stomach, it was found that the wireworms present were dead. In some cases where this was tried later, the wireworms were found to be still alive; but it is believed that the explanation of this fact has now been discovered. Creosote does not appear to have much effect upon the worms below the stomach.

"If an overdose is given by mistake, and if the sheep appears severely affected by it, the animal should be placed in the shade. Even in some cases of very severe overdoses, where the animal is given up for dead practically, it may entirely recover within an hour.

"If, in addition to the stomach worms, the animals were suffering from severe infection of bowel worms, such as the hookworms, better results were obtained in the treatment when powdered thymol was added to the creosote. In cases of this kind, the

* 99 ounces equals 6 pints and 3 ounces.

creosote solution is prepared, as directed above, and 30 to 80 or even 100 grains of thymol added to each dose after it has been measured.

"Thymol is expensive, the price varying in different parts of the country. It may be purchased by the ounce, but it is considerably cheaper if purchased by the pound. Avoid using thymol which has become yellowish or reddish and which has run together in the bottle so as to form a solid mass. Powder the crystals and have the druggist measure 30 grains. Give 30 grains to a lamb, about 50 grains to a yearling, and 70 to 80 or 100 grains to older sheep, according to size.

"In experiments I have had excellent results with a single dose of the creosote and thymol mixture. If necessary, however, the dose could be repeated after a week.

"The popular method of drenching is with a bottle. The use of a drenching tube is, however, far more satisfactory. A drenching tube may be made by taking an ordinary tin funnel, which may be purchased for 5 or 10 cents, and inserting the narrow end into one end of a rubber tube or hose, say 3 feet long and three-eighths or one-half inch in diameter; into the other end of the rubber tube is inserted a piece of three-eighths-inch brass or iron tubing about 4 to 6 inches long.

"The metal tube is placed between the animal's back teeth, and the sheep or calf is allowed to bite upon it. The water or drench is poured into the funnel, which may be held by an assistant or fastened to a post at a convenient height. The man who holds the metal tube between the animal's teeth can control the animal's head with the left hand, and by holding the tube in the right hand, near the point of union of the rubber and metal tubes, he can easily control the flow of the fluid by pinching the rubber hose. Care must be taken not to hold the patient's nostrils closed, otherwise the dose will enter the lungs.

"It is usually advisable to fast animals twelve to sixteen hours before dosing.

"Different persons prefer to hold the animals in different positions during drenching. Thus (1) the animal may be left standing on all four feet; or (2) it may be placed on its haunches, one man holding its back up against his own body; or (3) it may be placed directly on its back on a sloping piece of ground, its head being in a direct line with its back, and higher than its rump; or (4) it may be placed upon its side, the head being brought around so that the horns are squarely on the ground; the operator may then place one foot on one of the horns (especially in the case of semiwild cattle) and thus aid in holding the animal still.

"So far as administering the dose is concerned, the position on the back (3) is by far the easiest in the case of sheep, and the side position with head down (4) is the easiest in dosing cattle; furthermore, in these positions there is much less danger of an accident by getting the dose in the lungs. If animals are dosed standing or on their haunches, the nose should never be allowed to go above the eyes; otherwise the drench may pass down the windpipe into the lungs.

"By dosing sheep with water colored red and blue with dyeing material, and killing the animals immediately after the liquid was swallowed the following results were obtained:

"If the dose was given with the sheep standing, (1) almost the entire quantity went directly into the fourth stomach; if the sheep was placed on its haunches, the fluid passed in part into the fourth stomach and in part into the first (the paunch); if the sheep was placed directly on its back (3), or if a steer was placed on its side (4) with head down, almost the entire dose passed into the first stomach (the paunch). If the animal, even when standing (1), struggled to a considerable degree, a portion of the fluid passed into the paunch.

"It will be immediately apparent that these facts are of practical importance in dosing. If, for instance, gasoline, turpentine, or creosote is used, better results may be expected, if the sheep is dosed standing (1).

PREVENTIVE MEASURES.

"First. Every ranch should have a hospital pasture situated on high, dry ground, well drained, and without any pools or ponds. This should be supplied with raised troughs for watering and feeding, and the water supply should come from a well. This pasture should not drain into any pasture in which healthy stock are feeding.

"Second. As soon as any sick animal is noticed in the large pasture it should be immediately separated from the healthy stock and taken to the hospital pasture. To allow sick animals to run at large with healthy stock means to deliberately permit the spread of infection in the pastures and thus endanger the uninfected animals.

"Third. Proper watering places should be supplied in the large pastures by digging wells and erecting windmills to pump the water into tanks. These tanks should be raised above the ground so that they can not become contaminated with the animal's droppings being washed into them by rains and floods.

"Fourth. Select high sloping ground for pasture when this is possible. Low pastures should be properly drained.

"Fifth. When practicable, burn the pastures regularly, thoroughly, and systematically. The heat from the burning grass will kill many of the eggs and young worms on the grass, ground, and in the droppings.

"Sixth. As parasites are more fatal to young animals than to old, a liberal supply of oats or some similar food will aid in giving to young animals strength which will enable them to withstand the infection. A daily allowance, say, half a pound of oats per lamb, ought to reduce the mortality. At first they may not be inclined to eat it, but they will soon become accustomed to it. This simple precaution is reported as very effectual in New Zealand.

"Seventh. Keep plenty of salt accessible to the animals. Some men add slaked lime to the salt; others add 1 part of sulphate of iron to 100 parts of salt. As a matter of experience, salt kills many young worms."

In the Southwest the goats are sometimes affected with grub in the head. These outbreaks are usually due to local causes and have not been difficult to overcome. The treatment followed is the same as for sheep.

The treatment recommended for the screw worm is as follows: Add to any one of the carbolic sheep dips 10 per cent of chloroform. Apply this mixture, after thoroughly cleaning the wound, with a wad of cotton. The chloroform immediately destroys the larvæ and the carbolic dip prevents the further blowing of the wound.

The stomach worm (*Strongylus contortus*) is the same form as found in sheep, cattle, and deer. The treatment in all cases is the same as for sheep.

In this connection it is proper to state that there are proprietary worm powders on the market for stomach worms which are used in enormous quantities with sheep and goats, and they have given quite general satisfaction. The toxaline treatment, which is well known to readers of sheep journals, has many strong advocates among those who have used it. These facts are given because the goat breeder, no less than the sheep breeder, is entitled to all information that has in any way proved valuable.

Goats have at least three kinds of scab parasites peculiar to their species, but apparently only two kinds of scab develop. Psoroptic scab of sheep does not develop disease upon them, though it can undoubtedly sustain life for a while.

Tapeworms of the genus Moniezia are found in goats. In the intestines are also found five round worms, namely, *Strongylus filicollis, Aesophagostoma venulosum, Sclerostoma hypostomum, Uncinaria cernua,* and *Trichocephalus affinis.*

Verminous pneumonia of sheep also occurs in goats.

Tuberculosis is so rare in goats that it may be said that they are practically immune from this widespread and insidious disease.

Takosis in Goats.—A disease of goats which appears to be prevalent among the flocks in certain sections of this country was investigated by the Bureau of Animal Industry in 1902, and described in the Nineteenth Annual Report under the name of Takosis, by Dr. Jno. R. Mohler. This term is used to designate a progressive debilitative, but none the less highly fatal, infectious disease, the symptoms and lesions of which are entirely unlike any of the known diseases which affect this species of animals. Reports have been received from goat owners in Oregon, Missouri, Virginia, Maryland, Illinois, Pennsylvania, Michigan, and Massachusetts, all describing the affection as an incurable, weakening, and wasting disease, usually accompanied by uncontrollable diarrhea and occasional cough.

That this disease is not of recent origin appears evident from an article in the Country Gentleman of April, 1876, which states that, despite the friendly warning of a naturalist against taking Tibet goats into Georgia, the writer in 1854 consummated a purchase and encountered some thoroughly discouraging experiences. Later in recounting these experiences he wrote that all the Tibet goats, pure and grades, in his flock died in a few years after the purchase from a disease of the lungs combined with dysentery. A writer in the Country Gentleman of February 4, 1875, also reports serious losses in a flock placed in his care. Although no specific symptoms are recorded the description is highly suggestive of takosis.

Pegler (1885), in his description of a disease peculiar to goats, has mentioned the symptoms which might in most particulars very well be applied to a flock affected with this disease. Notwithstanding takosis appears to have been known to some individual breeders for a long time, it seems to have remained in a smoldering condition and not until the affection became so widespread during the past year was its economic importance brought to the attention of the Bureau of Animal Industry and the character and causation of the disease elucidated.

Takosis of goats is undoubtedly contagious and the recent

investigations have proven conclusively that it is caused by a specific organism the *Micrococcus caprinus,* which need not be described here.

In order to demonstrate the pathogenic properties of this micrococcus and establish its etiological significance to the disease in question, inoculation experiments were conducted upon white mice, white and brown rats, guinea pigs, rabbits, chickens, dogs, sheep, and goats. Of these animals, dogs and rats have appeared totally immune. The only noticeable effect of inoculation upon sheep was a temporary rise of temperature.

The disease presents many of the symptoms usually accompanying a parasitic invasion of diarrhea and pneumonia. In the early stages of the affection there is usually little to indicate that anything is seriously amiss with the animal. The first observable symptom manifested is the listless and languid demeanor of the animal evidenced by its lagging behind the flock and is usually accompanied by a drooping of the ears and a drowsy appearance of the eyes. The pulse is slow and feeble and the temperature is elevated slightly at first, but becomes subnormal a few days before death. The highest temperature observed in the natural disease was 104.1° and the lowest, in a prostrated animal a few hours before death, registered 99.7° F. Snuffing of the nose, as in a case of coryza, and occasionally coughing is sometimes in evidence. They would move about in a desultory manner, with back arched, neck drawn down toward the sternum, and with a staggering gait. Rumination is seldom impaired. The appetite, while not so vigorous, is still present, though capricious, and the affected animals show plainly that the ravages of the disease are rapidly overcoming the restorative elements derived from the food. The fleece usually presents a surprisingly thrifty appearance when the condition of the animal is taken into consideration. All the exposed mucous membranes are pale and the respirations are accelerated and labored. The goats become so weak that they are readily knocked down and trampled upon by their fellows. If picked up they move off slowly and eat a little, but within a few hours are down again, and in this way linger for several days, shrinking to about half their natural weight, and occasionally bleating or groaning with head bent around on the side or drawn down to the sternum. A fluid discharge from the bowels of a very offensive odor is usually observed in the last few days of life, but this symptom is not constant.

This disease may assume an acute or chronic type, the animal usually dying of inanition in from eight days to six or eight weeks.

Several owners have reported deaths after only two or three days of illness, but the goats doubtless had been affected for a longer period, although not noticed on account of their mingling in the flock. It is the consensus of opinion among the breeders interviewed that many of the animals succeeded in living for weeks, but they gradually became weaker and more debilitated and finally died in a comatose condition. In no instance has the natural recovery of an animal been observed after once the symptoms of takosis were noted. The younger goats seem to be the most susceptible to the disease, although the old animals are by no means immune. The does, wethers, and bucks all become affected, but probably as a result of the usual preponderance of does in a flock the latter appear to be the most susceptible.

As already indicated the general appearance of the carcass simulates that produced by a wasting disease. The visible mucous membranes are pale and anemic, while the fleece, which appears dry and lusterless, furnishes a shroud for the extreme emaciated condition that is perceptible on skinning. This masking quality of the hair prevents an accurate estimate of the condition of the animal by the eye alone and necessitates handling of the individual cases to appreciate to the full extent the inroads made by the affection. The same anemic condition of the subcutaneous and muscular tissues is observed in dehiding the carcasses. The lungs in most cases are the seat of a peculiar diversified inflammation, never of a remarkable extent. The external appearance of these organs is at times mottled, caused by a few congested areas, several patches of an iron-gray color similar to areas of pneumonia during the process of absorption and normal tissues. The liver is usually normal, but necrotic areas were observed in one case, due probably to parasitic invasion. The kidneys are anemic and softened. The intestines may contain normal fecal matter or semifluid feces of disagreeable odor.

The effects of internal parasites upon goats are very similar in many of their outward manifestations to the symptoms of takosis, but the infectious nature of the latter when compared with the enzootic course of a parasitic invasion will justify one in making a definite diagnosis. In attacks of takosis symptoms of pneumonia will be frequently noted, especially labored breathing or rapid respiration. These symptoms are not diagnositic of parasitism. The edamatous lump under the jaw so frequently present in cases of parasitism fails in takosis. The luster of the fleece is less affected in takosis, while diarrhea is more frequently noted. Finally in parasitism a careful postmortem examination will quickly disclose the presence of the offending parasites.

In goats anemia is very rare and when it does occur it is usually secondary to some previously existing disease as chronic pneumonia, peritonitis, or to poor food and starvation. It does not assume an infectious character and may be differentiated from the anemic condition accompanying takosis by the absence of the specific organism on microscopic examination.

Watery cachsia or hydremia usually results from poor feeding, innutritious food, and pasturing in low lands. The natural goat pasture is high, dry lands. The animal is weak, readily exhausted, breathes rapidly and heart palpitates. The mucous membranes of the eyes, nose, and mouth are pale and swollen. The edema which is present about the head and neck and abdomen will serve to differentiate this disease from takosis. This edema of the head disappears when the animal lies down. Icterus may accompany the disease when the discoloration of the mucous membrane easily establishes the nature of the affection. A change of pasture and a more nutritious diet are accompanied by a return of health to the flock.

In the study of takosis, four points have been brought prominently into view which may properly be grouped together when considering measures for the prevention of the disease. Sudden climatic changes should be avoided so far as possible, and when shipments of goats for breeding purposes are to be made, which necessitate their transportation northward over considerable distances, the changes should be made during the months of summer or late spring, and not in the fall or winter, when the contrast of temperature will be so much greater. The second precautionary measure is closely allied to the first, namely, Angora goats should be provided with stables that are thoroughly dry, not alone in their ability to shed rain, but they should be placed upon ground that has perfect natural drainage, and these should be accessible by them at all times, as the effect of rains upon the general health and strength of these animals has been frequently proven to be very disastrous. So great is their natural aversion to a wetting that they will seldom get caught out in a shower if shelter is within their reach, but will leave their browsing and march under cover before the downpour. As a third measure of prevention may be mentioned careful feeding. No animal is as well fortified against the attack of an infection when reduced by lack of nourishment as it is when in a vigorous, thriving condition. Among the predisposing causes of disease, usually enumerated by general pathologists, will be found debility due to insufficient or unsuitable food, and although the reason for this may not be established beyond the

reach of argument, it is pretty generally conceded that the continued lack of proper nourishment establishes in the blood of an animal an abnormal degree of alkalinity which grants an increased susceptibility to the inroads of pathogenic organisms. The last preventive measure to be mentioned is one that is applicable only after the disease has made its appearance in the flock. The segregation, or isolation, of all affected animals as soon as they evince any symptoms of the disease, will be found a most valuable means of protection for those that remain unaffected, and a strict quarantine over all of the diseased members of the flock should be maintained so long as the disease remains upon the premises.

The sheds, yards, and corrals where the animals have been kept should be disinfected with a five per cent solution of creolin or carbolic acid.

The most pleasing results that have been derived from the use of drugs have followed the administration of calomel given alone in .10 gram doses twice daily for two days, to be followed by powders composed of arsenic, quinine, and iron as follows: Arsenious acid, 1.40 grams; iron, reduced, 12 grams; quinine sulphate, 6 grams. Mix and make into twenty powders, giving one to each adult goat morning and evening, at the conclusion of the administration of calomel. After an interval of two days this treatment is repeated.

Experiments are at present under way with a view of procuring a vaccine for the preventive inoculation of exposed goats, but the results thus far obtained are not uniform, and further investigation must be made before any definite statements will be hazarded.

Goats are apt to have foot rot, but a cure is easily effected by the use of sulphate of copper (blue vitrol). It is usually applied by driving goats through a trough containing a solution of strong blue vitrol. The solution should be about an inch in depth. Oscar Tom, a breeder of much experience, says: "Butter of antimony applied with a stiff feather will cure it, or mix 1 ounce of sulphuric acid with 2 ounces of vinegar and apply as above. Go over the whole band. Generally one application cures if well done. Change the range at the same time if you can."

All goats become infested with lice if they do not receive proper attention. It is not a difficult matter, as all men agree, to rid goats of this annoyance by dipping them, as sheep are dipped, in any of the common sheep-dip preparations. The animals can not thrive to best advantage when they are carrying a fleece full of lice; oftentimes the lice become so numerous as to cause the goat to lose much flesh and finally to fail to produce a

good quality of mohair, or even to produce a kid, if the infested animal is a doe. Goat raisers should know that an animal which is badly infested with lice in the winter always requires an extra amount of feed; in other words, if lice are to be raised they must be fed. The better practice is to dip goats twice a year—in the spring just after shearing and again in the fall.

One of the principal enemies of the Angoras is the wolf. The best guard against wolves is a good wire fence. Sometimes the wolves dig under the fence, and then it becomes necessary to trap them. This is practiced by H. T. Fuchs, who says: "Three steel traps are fastened to each other, but to nothing else, and catch the wolves. If the trap is made fast the wolf will break loose, but the weight of three traps fastened together simply tires the wolf out, and it rarely drags them more than 200 or 300 yards."

In many localities the wildcats are especially troublesome. Their prey is the kids.

CHAPTER XIII.

THE SKINS AND THEIR USES.

Their Use as Rugs, Robes, and Trimmings.

The skins of the Angoras, if taken when the hair is about 4 inches long, make very handsome rugs. The hair retains its original luster, and may be used in the natural white or dyed any color desired. The pure white ones are more generally preferred. There is a demand for Angora rugs in the United States which so far has not been supplied by domestic production. These rugs can be purchased at prices ranging from $4 to $8.

Another article of manufacture from the skins is the carriage robe, rivaling in beauty and durability the buffalo robe, which is no longer a factor in the market. They are not expensive when the demand for skins is considered, and may be purchased for about $20. The smaller skins of the does and wethers and the kid skins find an extensive use in baby carriages, and are exceedingly attractive in their brilliant whiteness.

These skins are used largely in the manufacture of children's muffs and as trimmings for coats and capes. The finest kid fleeces adorn the collar and border of the ladies' most handsome opera cloaks. In the stores they are sold often under some peculiar name which does not inform the purchased that they are ornamented with the hair of the Angora goat, and so thousands of such articles are worn by people who are unaware of the true name of their "furs."

Their Use as Leather.

While the skin should always be taken as an item of salvage, it is not at all probable that it will ever be profitable to produce them for leather. The skin should be removed from the carcass very soon after death, else decomposition in its most incipient stage will cause the hair to "slip." If the skin happens to contain a fleece of sufficient length, it might be converted into a rug or robe; if not, it can be tanned and used for binding books or manufactured into gloves of excellent quality. The skin of the Angora is of a more delicate texture than that of the common goat and so is not suitable for shoe leather. This feature will

forever preclude the possibility of its becoming a competitor of the goatskins, which are now imported for shoe leather. Angora skins for leather will not bring as good a price in the market as those of the common goat. A prominent New York dealer in skins says: "Domestic skins are worth from 50 cents for kids up to $2 each for large full-fleeced pelts. The low, crossbred common skins and short pelts not suitable to dress are used by morocco and glove leather manufacturers, and are worth from 15 to 18 cents a pound for large sizes down to 10 and 11 cents for small ones and kids."

Tanning and Dressing the Skins.

There are many recipes in various books for tanning and dressing skins; but the sale of Angora rugs and robes at good prices depends so much upon their excellent appearance that it is recommended that the work be placed in the hands of a professional tanner. Even then it is well to be certain of the character of his work, for goat men have frequent cause of complaint that their skins have not been well manipulated. Tanners who have done good work with Angora skins should advertise in those papers which devote space to Angora goat discussion. They will help themselves and at the same time aid a feature of the industry that is to be ever present.

Importations of Angora Goatskins.

While there is a duty of 12 cents a pound on mohair and a varying schedule applying to mohair manufactures, skins having fleeces attached are admitted duty free. Importations are without doubt very considerable, as large numbers are in use, and we know that the domestic production is yet very limited.

The two tables herewith will give some idea of the extent of importations at Boston and Philadelphia. The importations at New York must be much greater, but the reports previous to 1902 are not readily available.

IMPORTATION OF ANGORA GOATSKINS INTO THE PORT OF BOSTON FROM 1898 TO DECEMBER 15, 1901

Date of Entry.	Number of skins.	Weight.	Value.
1898.		Pounds.	
July	1,800	5,388	$574
August	750	2,292	244
1901.			
April	2,378	6 942	705
July	2,585	8,308	914
August	400	2,247	239
October	750	2,196	245
November	900	2,898	319
December 15	1,500	4,306	480

IMPORTATIONS OF ANGORA GOATSKINS INTO THE PORT OF PHILADELPHIA FROM 1896 TO 1901.

Date of Entry.	Pounds.	Value.
1896	706,571	$ 76,378
1897	716,343	86 841
1898	19 540	2,754
1899	1,113,974	152,601
1900	790,782	144.577
1901	430,458	62,707

AFRICAN GOATS.

CHAPTER XIV.

MINOR FEATURES OF IMPORTANCE.

Enrichment of the Land.

In the chapter dealing with goats as brush exterminators reference is made to the enrichment of the land by their droppings. This benefit is decidedly noticeable on land where they are kept a year or more. This is a factor of no small importance, not only where the goats have been employed to destroy brushwood, but on cleared land which may have grown up to weeds which the goats eat greedily.

The sheds where the goats are kept at night should be cleaned out frequently and the manure preserved in bins where it can be kept dry. This manure may afterward be put upon the land in accordance with the farmer's plans. Goat manure was applied to the corn crop on a worn-out farm in Maryland with wonderful results. Land which ordinarily would not yield over fifteen bushels to the acre gave forty bushels after the goat manure was applied. Owing to the scarcity of the manure, much of it was applied by the handful at a time in the hill as the corn was planted. This is the practice with commercial fertilizers and is getting the most out of little. Manure is considered as one of the resources in the best system of modern farming, and it should be taken into account by any one who is keeping goats or is contemplating doing so.

There is no better fertilizer for fruit trees and lawns than goat manure, and none equal to it for this purpose except sheep manure. The droppings of goats and sheep are about equal in fertilizing value. It has been estimated that the value per ton of the manure produced by a sheep is $3.30, and it is certain that the goat produces as much and probably more than the sheep.

Protection for Sheep.

The statement that an Angora buck running with a flock of sheep will protect them from the attack of dogs has received wide publicity. Much that has been published is without foundation, yet much also is correct. Some breeders state positively that the goats are as cowardly as sheep and just as liable to be attacked by

dogs, while others cite instances where dogs have actually been driven off. No doubt both statements represent the experiences of the respective breeders. It is a fact that one or two bucks will serve to protect a flock of sheep if they are trained to attack dogs. Very little effort is required to train them, for they are fighters naturally, and their pugnacious disposition is easily developed. Indeed, the most docile doe may be trained to do the same service. Some pertinent remarks along this line are made by H. T. Fuchs, of Marble Falls, Tex., a well-known breeder of Angoras. He says: "It is quite amusing to see the courage of a doe when she protects her young kid from a dog, or hog, or flock of buzzards. Two of my neighbors' dogs got in the habit of killing my kids, and one doe protected her kid quite a while from the two large vicious dogs until the neighbor caught one of the dogs and gave him a good whipping, when the goat assisted in this work by butting the dog with all her might. You should train the goats to be brave by taking your dogs into the goat pen with you, and, in case the dog refuses to run from a brave goat, scold the dog to make the goat think that she whipped him. If you had a tame wolf trained in that way you could train your goats to fight wolves."

Because of their inclination to fight dogs, bucks have been employed in small numbers—say from one to three—to run with sheep. A few will remain with sheep for their company, but a considerable number are apt to separate to themselves and remain away from the flock.

There is very little complaint regarding the ravages of dogs by breeders of Angora goats, while the sheep raiser has them as his foe always. Ordinarily an Angora buck will vanquish a dog and it is not likely that the goat industry will suffer from the ravages of dogs.

Notwithstanding all this, the owner of Angoras will be wise if he keeps a close watch upon them until they demonstrate their ability to care for themselves in a contest. It might be well to send a few bucks to the kind of school mentioned by Mr. Fuchs.

Disposition of the Angora.

The remarkable intelligence of these little animals has already been mentioned; but a question often asked is "Are they ugly?" Yes, if they are made so by teasing, just as dogs, cats, horses, or pet roosters are made ugly. In flocks they are as docile as sheep and very soon learn to regard man as their friend.

Their Use as Pets.

The highbred Angoras are very graceful, and their beautifully shaped bodies and fine silky hair make them very attractive. There is no animal, except possibly the horse, that is more beautiful than these goats, and no animal is more cleanly in his habits. As pets for children they are very popular, if they can be kept where they will be harmless to vegetation and anything made of cloth. They have all the propensities of the common goat for destroying fruit trees and chewing any kind of cloth and of climbing upon roofs. All kinds of goats are mischievous in the extreme. The Angoras are tractible and are often harnessed to carts, as are common goats, and their beauty makes them more desirable for this purpose. They are remarkably intelligent and are easily trained. The high-grade Angoras are free from the "goat odor" so objectionable in the common breed, and this is a very good reason why they are preferred as pets even if their beauty is not considered. It is true, however, that the average high-grade Angora is a smaller and more delicate animal than the common breed and must not be expected to draw heavy loads.

Where to Buy Angora Goats.

In this industry, as in every other, the public is informed that there are breeders of good goats, breeders of poor goats, brokers in all kinds of goats, and a host of unscrupulous dealers who are taking advantage of the great interest manifested at this time and have no reputation to lose. Most people who purchase express a desire to see the animals they buy. This is natural and affords some satisfaction; but the fact is that, unless such a buyer is familiar with goats, he will know very little about them after seeing them. There would be no difficulty in imposing upon him. If one is not familiar with the points of an Angora, he would himself be liable to choose the poorest animals out of a flock. Because an animal is large, lively, and strong is not an evidence that it is worth the cost of expressage to the next town.

In this industry, as in all others, the purchaser must depend largely upon the reputation of breeders. There are very many entirely reliable breeders, and it is not a very difficult matter to ascertain the standing and practice of any one who offers goats for sale. Prospective purchasers should consult the advertisements of goat breeders, and, if any question arises in the mind, ask such breeders for references. And, too, let such a man, if he orders goats, to be paid for on delivery, furnish references as to his own reliability. If he writes to some one not directly interested,

let him inclose a stamp for reply. A stamp is a small matter, it is true, but the postage bill of some breeders amounts to several dollars per month.

How to Handle Angora Goats.

The best way to catch and hold an Angora is by the horns. It will struggle but little after it finds that its horn is in a secure grasp. To catch hold of it any other way gives it an opportunity to show all its strength, which is not a little in a healthy goat. Sheep are often caught by the wool and held without giving pain apparently, but it is painful to a goat to be caught thus. Many who are not familiar with the Angora seize it by the fleece at once, without a thought of the pain they give. This is not only painful for the animal but it is difficult to hold it when caught in this way.

If it is desired to place the animal on its haunches, take its right horn with the right hand, if standing on the right side of the goat, and seize the left front leg with the left hand, and then lift it up, at the same time pulling it backward over the feet or knee. This is easily done and done without injury. To place the animal on his back or side, reach both arms over its back, seizing a front leg and a hind one and then lift it up onto your knees quickly. It can then be placed in any position desired.

Will Angoras Cross with Sheep?

They will not cross with sheep, for the reason that goats and sheep are not of the same genus. This statement is made upon the authority of leading naturalists in this country and with full knowledge of the reports of the existence of such crosses, but they are, like the petrified human being, "somewhere else." There is a peculiar animal in New Mexico called the "cabrito" (male) or "cabrita" (female), Spanish words for the young of the goat. It is commonly but incorrectly spelled "cabretta." This animal, especially when young, resembles the young of the goat very much, and from this fact it probably receives its name. It is nothing else than a lamb, the offspring of the Navajo ram upon a ewe of a common and better developed breed of sheep. There is no goat blood in it. The Navajo sheep, especially the ram, is said to be a coarse-wooled, leggy, upstanding creature, with horns extending backward like those of the goat, and might, upon casual observation, easily be taken for a goat. It is the wool of this sheep that is made into the well-known Navajo Indian blankets.

Schreiner cites several records of hybrids of the goat and the

sheep, and says he had himself seen four animals "represented as being the hybrid progeny of such a cross."

The facts which confront us in discussing this question are that Angoras and sheep have been running together in this country for the last fifty years, and yet no one of scientific standing has ventured to say that he has seen a hybrid from them. From the practical standpoint of the breeder it is entirely safe to say that the goat and sheep will not interbreed.

Colonel Peters, in the American Agriculturist, November, 1876, says: "Prior to the year 1860 I tried many experiments, in hopes of obtaining a cross between the goat and sheep, and failed in every instance. Extensive correspondence with other breeders has convinced me that the cross can not be obtained. Dr. John Bachman, the celebrated naturalist of Charleston, S. C., who was in correspondence with the most distinguished naturalists of Europe, informed me that he had no faith in the theory, and did not believe the cross obtainable. He stated, however, that Cuvier, the renowned French naturalist, claimed to have examined a specimen of such a hybrid, but Dr. Bachman himself believed that Cuvier had been deceived, or had made a mistake.

How to Designate the Sexes.

The proper designation for the male goat is "buck" and for the female "doe." Previous to the issuance of the Government bulletins, the buck was indiscriminately referred to as male, sire, buck, ram, and billy; and the female was known as doe, ewe, and nanny. The terms "buck" and "doe" used in the publications referred to are generally adopted at this time, and are given official sanction by their use in the catalogues and premium lists of the American Angora Goat Breeders' Association.

The castrated goat is designated as a "wether," as with sheep. In Cape Colony he is called a "kapater," and the sheep wether is there called a "hamel;" but these are foreign words which mean no more than our own American words, and there is no reason why they should be adopted by us.

The young is called "kid," and there appears to be absolute unanimity in this designation.

What to Call the Flesh.

The flesh of the Angora goat has not yet been found in many markets, and there is yet no general accepted term for it. Some speak of it as "Angora mutton" and others as "Angora venison." It is claimed that if an animal has had a liberal diet of leaves and twigs while being fattened its flesh has the game flavor of

venison, and people who are familiar with this kind of feeding, call the meat Angora venison. If an Angora is fattened largely on forage and grain, its flesh will have a taste very much like mutton fattened under similar conditions. Those who have eaten of this kind of Angora flesh call it Angora mutton. Since it is entirely probable that most Angoras that will go into the market for meat will be finished off on grain, and so resemble mutton, it is better that the flesh be called Angora mutton. The term is just as good as "Angora venison," and it has a domestic sound.

By-Products Not Elsewhere Mentioned.

In the modern methods of economic production and manufacture nothing is permitted to go to waste. Whoever it was that said facetiously that the packers saved every portion of a hog but his squeal spoke the truth. The same truth applies as well to the carcass of any food animal. In the case of goats the horns find many uses, and the fat is said to be the best tallow known for the manufacture of candles. Any part of the carcass not useful in any other way is converted into fertilizer.

Registration Association.

The American Angora Goat Breeders' Association was organized in 1900 at Kansas City, Mo. Previous to that time there was in existence the National Angora Record Association, with headquarters at Salem, Oreg., but its members generally entered the first mentioned and the latter went out of existence.

As it is not known that there exists anywhere a purebred Angora goat, it was manifestly impossible to base registration upon pure blood. The association created a force of inspectors whose duty it was to inspect goats for registration upon application and recommend to the secretary. Any goat fulfilling the standard requirements was registered. The number thus registered was 40,000.

The registration books were closed against all such inspections on December 31, 1901. Since then only the offspring of registered parents are eligible for registry.

The Tariff.

The act approved July 24, 1897, places a duty of 12 cents per pound upon mohair. Mohair cloth for buttons is taxed 10 per cent ad valorem. These rates are subject to increase under certain conditions of shipments. Angora skins with mohair attached are admitted free of duty.

The Province of a Goat Paper.

The purpose of this manual is to touch upon all points of the Angora goat industry, yet the author is conscious of the fact that a thousand questions will grow out of the experience of the next few years. No one could pretend to assume to know what they will be and to answer them at this time. While a manual of goat raising is invaluable and ought to be in the hands of every goat raiser, and its contents thoroughly familiar to him, it can not take the place of the journal which devotes space to the industry. Every day little matters of perplexity will arise and every week they find answer in the goat columns. The horse, cattle, sheep, and hog industries are represented by scores of volumes, yet no breeder of any one of these animals would try to succeed without a paper devoted to the subject; so goat raisers will do well if they decide at once to take a paper which is alive to their interests.

A Few Words About Common Goats.

While this volume does not deal with the subject of common goats, there are innumerable questions continually arising about them. No effort will be made here to answer all these questions, but it is deemed advisable to touch upon a few of the leading ones.

There are about a million common goats in the United States, according to the Twelfth Census. They are widely disseminated, but there are very few flocks of any considerable size. Where they are most numerous they are not kept for any special purpose and no particular attention is paid to them. Like Topsy, they "just grow." The kids are sometimes used for meat, and are nice, and occasionally a doe is milked for family use. They are not raised in this country for their skins, as they are found not to be profitable. The effort to do so has been made under very favorable circumstances, and the result was that the gross income averaged but 80 cents per head. The domestic supply of skins, therefore, is nothing. We depend altogether upon imports for our goatskin manufactures. The table herewith, from Treasury reports, shows that we import goatskins, morocco leather, and gloves in very large quantities:

QUANTITY AND VALUE OF IMPORTS OF GOATSKINS, MOROCCO SKINS, AND GLOVES FOR THE YEARS 1896 TO 1901.

Year.	Goat Skins.		Morocco leather.	Gloves.*
	Quantity.	Value.	Value.	Value.
	Pounds.	Dollars.	Dollars.	Dollars.
1896	38,882,234	8,803,609	2,808,322	5,618,311
1897	59,177,556	13,802,504	3,748,341	6,337,410
1898	65,546,570	16,854,430	2,452,655	5,686,464
1899	80,064,583	20,992,949	2,831,035	5,544,871
1900	69,104,372	19,008,097	2,940,949	6,433,941
1901	88,043,928	25,265,670	2,399,603	5,060,224

Will Sheep Destroy Brushwood.

The statement is frequently made through the press that sheep will destroy brushwood just as effectually as goats, and the question whether they will or not is often asked by those who contemplate the purchase of either goats or sheep to clear their land. The sheep is naturally a grazer, but it will browse a little occasionally, while the goat is naturally a browser and will graze occasionally. Sheep will not long thrive or even subsist upon a brushwood diet. Neither will they completely annihilate brushwood as the goats do. Where goats do this an equal number of sheep would hardly make an impression. The sheep has its uses—and great they are—but the extermination of brushwood is not one of them.

The Rocky Mountain Goat.

The Rocky Mountain goat is a large strong animal, with a dense fleece of mohair and coarse hair, about equally divided as to quantity, and about equal in length. Samples which have been examined by the author show the mohair to be of good quality so far as fineness and luster are concerned, but whether it could ever be produced in quantity sufficient to be of any economic use is doubted. The goats are exceedingly rare, and it is not probable that they would thrive well outside their present high altitude—that of the higher Rocky Mountains.

The hair is of two colors—white and black. The white would bring from 12 to 15 cents per pound, and the black about 5 cents, at the mills. It would be serviceable in the manufacture of carpets.

Several writers have suggested the possibility of producing a stronger Angora by crossing with the Rocky Mountain goat. The

* Imported chiefly from Germany and France, and from other Europe in smaller quantities.

writer is not inclined to think well of the suggestion. There is already too much foreign blood in our Angoras, and the future success of the mohair industry depends upon our ability to get rid of it.

CHAPTER XV.

MILCH GOATS.

The Milch Goat Situation.

Milch goats are a familiar feature of the live stock industry of Europe. They are especially prominent in Switzerland, Italy, Germany, France, and Spain, and the Island of Malta. Many may also be found in Egypt, Russia, and Norway. They are, by their habits of life, peculiarly adapted to the needs and surroundings of the peasantry, or poorer classes, of these countries. There is, indeed, nothing truer or apter than the homely saying that "the goat is the poor man's cow." This is so because milk, which is food and drink to all mankind, is furnished by the goat in its cheapest form; because its quality is superior to cow's milk for all purposes; and also because the proportionate yield is much greater than that of a cow. It is frequently said that the feed required for one milch cow is sufficient for eight milch goats.

In the old countries goats hold a respectable place in the live stock industry. There they are not the subject of every one's effort at jesting, as they have always been here. The Angora goat industry in this country has developed to such proportions that it is now looked up to with dignity, even by the jesters, and is sharing its respectability with the milch goats. The implied slur at the milch goat which occurs in a published remark concerning a certain small breed of dairy cattle that "they might do for a man who is too poor to own a cow and ashamed to own a goat," is no longer in order.

It is true that a milch goat is not handsome; neither is the best milch cow handsome. It must be confessed that it is destructive in its habits and tendencies if not restrained; so also are cattle and hogs and chickens. Everybody knows that it is mischievous, oftentimes to an exasperating degree, but this same charge applies to your neighbor's boys as well. Remember this, that the waste from the kitchen will keep a hog or two, the waste grains and other food about the yards will feed a few chickens, and the weeds and twigs and waste vegetables will, with the addition of only a small amount of hay and grain, keep a goat or two. The

cow must have her regular meals of a particular menu; she is not allowed to convert waste of any sort into meat or milk.

There are no statistics at hand showing the number of goats in any of the European countries except Germany. The number in that empire for several years are given herewith:

1873	2,320,000
1883	2,641,000
1885	2,640,994
1892	3,091,287

Dettweiler gives some statistics of interest with reference to the annual value of the goats in Germany. His estimates follow:

	Marks.	
Value of goats	50,000,000	($11,900,000)
Value of milk produced	150,000,000	(35,700,000)
Value of kids slaughtered	7,500,000	(1,785,000)
Value of goats slaughtered	6,500,000	(1,547,000)

These statistics show that the milch goat industry of Germany is one of importance. The same general situation obtains in the other European countries mentioned.

The milch goat situation in the United States is at the present time practically confined to an awakening interest. There is an insistent demand for information on the subject. Physicians who know of the healthful qualities of goat's milk are considering the advisability and possibility of obtaining a supply for the needs of their patients. People in moderate circumstances in the suburbs of our large cities are asking whether they can not do better by keeping goats. The poorer classes of these suburbs, to whom milk is a luxury, are wondering if they can not find a blessing in a milch goat. It is more than probable that the miners in the coal districts would find in the goat a profitable friend.

The author would feel that something of value, especially in the way of suggestion to persons of wealth, would be lost if he failed to mention the work undertaken by Mrs. Edward Roby, of Chicago. She is well known throughout the country, being a member of the Daughters of the American Revolution, Daughter of 1812, member of the Woman's Federation and the Woman's Press Clubs, and numerous other well-known patriotic organizations. She is also the founder and president of the Ladies of the Grand Army of the Republic, and at her home is serving her thirteenth year as president of the Woman's South Side Study Club. This much is said with the reluctant consent of Mrs. Roby, in the hope that her work with milch goats for the benefit of the poorer classes will afford suggestions to others. It shows that any work which has for its object the benefit of these classes is dignified by the support of such people.

MRS. EDWARD ROBY.

Mrs. Roby has been purchasing common goats which are giving a fair amount of milk, and has a few head which she personally selected on the Bermuda Islands. With these and such others as she may be able to obtain, she proposes to do all she can toward the development of the American goat. As fast as she has good milch goats to spare she purposes selling them at low rates and on time, if necessary, to the heads of such households as are most greatly in need of them, in order that the children may be better nourished and be relieved from the danger of disease that lurks in much of the cow's milk that finds its way to such households. Besides, if such a family possesses a milk-giving goat, it will save many dollars to the owner during many months of the year, and the problem of obtaining a livelihood will not be so difficult of solution.

It is everywhere acknowledged that the best way to help people who need assistance is to help them to help themselves. To introduce the milch goat into communities such as the suburbs of our large cities or into the coal-mining districts, will almost certainly work out wonderfully in economic results. German writers say boldly that the milch goat in its later development has done great service to the state, in that it supplies a want which before caused great unrest among the peasantry.

The real demand for milch goats will not cease. The need will always be present so long as there are mothers who can not or who will not nurse their infants—so long as there is tuberculous cow's milk—so long as there are children that need more nourishing food than is supplied to them—so long as there are people who can afford to own a goat but not a cow.

The Milk of the Goat.

Its various uses.—The various uses of the milk in its natural state (butter, cheese, and whey not considered) are these: (1) Food for the poor; (2) food for the invalid; (3) food for infants; (4) medicine for certain diseases.

As a rule the goat is the only useful domestic animal of the poorer people of Germany, especially of the day laborer, and it plays an important part in his household. Of necessity, it plays the part that the cow does in the households of the better classes. Says Dettweiler: "It furnishes to its owner without doubt the best milk for nourishing infants, for the household, for the cooking of food, and for coffee, besides butter and cheese. When one considers that it very often depends solely on the milk production of the goat whether the nutrition of the child and the whole family is bad or good, and the nutrition from infancy on has a bearing on

the ability to a greater or a comparatively small amount of work in later life, then one will believe me when I say that the goat is in a position to wield a great influence in sustaining life."

Petersen, having the peasantry of Germany in mind, sums up the value of the goats in this wise: (1) The possibility of procuring a goat is generally within the reach of the poorest families; (2) the risk and the insurance premium are disproportionately much less in the case of the goat; (3) the goat utilizes its food better than the cow, and gives considerably more milk in proportion to its body weight; (4) the goat is satisfied with little feed, and with feed of any sort, which is to be had at much less cost; (5) by keeping two goats instead of a cow, the family of the working man may be provided during the entire year with milk by the proper regulation of the time of the birth of the kid; (6) the goat gives a more wholesome milk than the cow and the milk is richer in fats."

Hilpert, in discussing the keeping of goats from a patriotic and social standpoint, comments as follows: "As to the question of human nourishment, the goat occupies an important position. It yields a wholesome nourishment for the family, serves as a useful and agreeable occupation for wife and children, and awakens in its owner a desire for industry and a spirit of frugality. So long as the workingman is glad in the possession of a business, has a small bit of ground to call his own, and has a profitable domestic animal, just so long will he be an opponent of social strife, a careful provider for the family, and an adherent of some recognized creed."

Hoffman says that in 75 per cent of the households of Germany where goats are kept they play an important role, not alone with the poorer classes, but with the more prosperous middle classes as well.

The following from Dettweiler shows something of the use of goat's milk for the food of the family in Saxony: "The cattle owners who keep goats in addition to one or two cows, number 13,409, with 17,439 goats. If this number be included with the one above, it is evident that with 60,974 goats owners keeping 80,048 goats, or about 75 per cent of all the goat owners in Saxony, the goat plays an important role as the source of the milk of the household; likewise that the homes that are here under consideration belong to that class of people who are without much means. Especially in the industrial districts of the mountains, with a preponderance of the smaller manufactories, the goat is the supporter of the family—in a broad sense, of the people among which

MRS. EDWARD ROBY'S MILCH GOATS.

it finds its manifold uses. In this way it comes about that goat's milk is such a universally established food material and one of which the people have become so fond that they will pay the same price (or in many places even a pfennig higher price) for it than for cow's milk, which latter serves to help out when there is a scarcity of goat's milk. The reason for this may be found in the higher nutritive value of goat's milk, and the assertion is often made here that anyone who has become accustomed to the use of goat's milk for coffee feels it a degradation if he is compelled to be content with cow's milk in its stead, which is not so good tasted and is poorer in fat than goat's milk. But the goat is beginning to rise in prominence and gain in numbers in highly developed, thickly settled districts where the people are more prosperous."

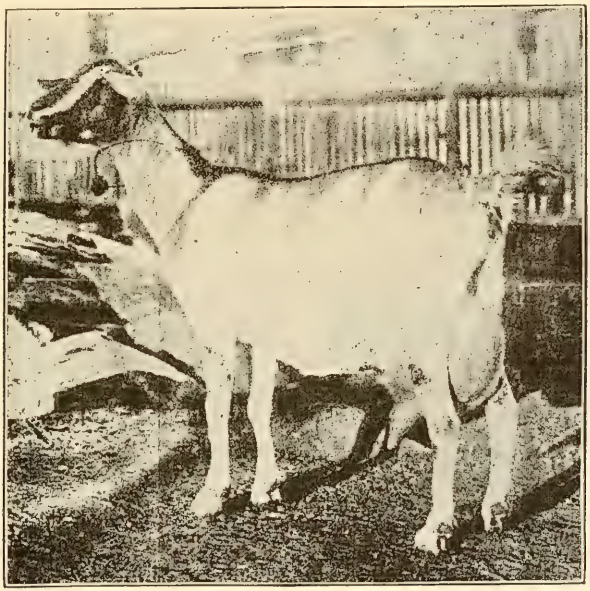
It may have already occurred to the reader that cow's milk is the universal milk of mankind and is, withal, a very good product, and is rendered free from tubercle bacilli by boiling. The advocates of goat's milk assert that boiling transforms the casein into a condition in which it is very difficult of digestion. Dr. Schwartz, medical counsellor for Cologne, holds this opinion and says that "it has come about that very often the boiling of milk is dispensed with." He also states that it is very difficult to accomplish complete sterilization of milk.

While discussing this feature, let us quote Renesse: "At the present time the effort is made to sterilize the milk by long continued cooking and to make it free of all germs, and for this purpose the most complicated apparatuses have been put upon the market. But it has been scientifically demonstrated that important substances are destroyed in the milk simultaneously with the long continued cooking, which are of great value in the feeding of suckling babes, especially in the development of the bony framework, and so it transpires that these so-called 'bottle babies' develop a picture of illness similar to rhachitis, in spite of the greatest care on the part of the parents. Furthermore, it turns out that the washing of the apparatus requires so much vigilance and time that the question of the use of it can not be entertained in the case of the incredulous working man who has quite a number of children and where the mother takes the entire care of the house."

Goat's milk is said to be especially desirable for use in tea and coffee and for pastry; and that whoever becomes accustomed to using it thus prefers it to any other kind. They like its taste and recognize its wholesomeness. It is recommended that, if one purposes to use goat's milk instead of that of the cow, two goats be

employed, one of which should become "fresh" in the spring and the other in the fall. By this means a constant supply is possible, whereas with one animal it would not be possible.

While we are discussing the use of this milk as food for the family, it will be interesting to read what was recently written to the American Sheep Breeder by J. R. Chisholm, of North Queensland, Australia, who said: "We had a terrible season last year and most of us lost heavily in sheep, but the goats kept us going in milk all the time, and it was in that dry time I overcame my



COMMON MILCH GOAT OF QUEENSLAND, AUSTRALIA.

prejudice and ate and relished goat meat, or, as you would call it 'venison.' The goats served us well until the rains came. I've just asked my girls about the flock, and they tell me they milk eighteen nannies and make four or five pounds of butter weekly from them and have, besides, an abundance of milk for our household of seven and a hired man. We think of selling our cattle."

As food for invalids the milk of the goat is almost universally endorsed. This is not only so because of its apparent medicinal qualities, which are discussed a little further along, but because of its high content of solids, which average a little over 14 per cent, and also because of its easy digestibility. This latter characteristic is due to the fact that the globules of goat's milk are much smaller

than those of cow's milk, and therefore the fat remains longer as an emulsion. Goat's milk creams very slowly and usually very unsatisfactorily, owing to the smallness of the fat globules.

The tables of analyses given show the fat of goat's milk averages about 4.5 per cent. A recent writer in the Rural World says it would be accurate to say that goat's milk contains about twice as much fat as that of the average Shorthorn cow and is far superior to that yielded by the best Jerseys. The same writer (Sirgar) says: "Individual instances, though they do not, of course, prove the average, may be quoted to show its extraordinary richness. The milk of an Angora goat which was analyzed by F. S. Lloyd, analyst to the British Farmers' Association, contained no less than 8.69 per cent of butter fat, and 9.85 per cent of casein and milk sugar, the water amounting to only 80.53 per cent; the water in the average cow's milk would be about 87 per cent. A crossbred Toggenburger and Nubian goat gave 8.11 per cent of fat, and we have seen no Jersey records that have reached these figures."

This from Hilpert is direct: "That it serves as a means of preserving health, witness the cures with goat's milk in the mountain sanitaria, especially for pulmonary diseases." It is certainly the best kind of argument that whatever acts as a curative agent should be the very best preventive agent as well.

A strong argument is made by Renesse for the use of goat's milk as a preventive of tuberculosis. In his paper he states that in Germany 100,000 people die annually from tuberculosis and the number of those who are sick with the disease is estimated at ten times as many; and they are, as a rule, persons in the prime of life. And this is not all—these tuberculous persons, through their long period of illness, are ever a menace to those who are not already infected. To counteract these conditions, Renesse advocates goat's milk as a curative and preventive agent.

In connection with the consideration of goat's milk as a food for invalids, one should read what is said further on regarding the relationship of goat's milk to tuberculosis.

The use of this milk for infants—say, babes under a year old—has given rise to contrary opinions. Those who have studied the goat's milk as a diet all agree to its beneficial results upon all who are old enough to have a good flow from the salivary glands, but some maintain that it may take the place of human milk from the birth of a child. For instance, Dettweiler says: "Goat's milk most nearly resembles woman's milk, and, on account of the ease with which it is digested, is attended with happy results in the case of the feeding of the sick and children." Hoffman says:

"Goat's milk more nearly resembles mother's milk than cow's milk when it comes to infant feeding." He also states that in Germany many children take the milk direct from the udder "as the kid does" and thus escapes any chance of milk infection. Zurn mentions the same practice and also says that goats will consent to suckle other young animals, such as colts and little pigs.

"Goats should prove to be very valuable as nurses. Professor Magne makes note in regard to this fact in his 'Handbook of Agricultural Cattle Breeding.' Goats are good mothers and readily adopt infants, calves, lambs, etc. The use of goats for suckling infants is familiar enough (in Germany, I do not know so much about it). In this regard they are of great value. The goats conceive a liking for the life which they nourish, since they conduct themselves with extraordinary ready willingness toward the one who takes their milk in the matter of gratifying the whims of the suckling or of the person who milks them. With lambs, they will lie down entirely when these can not easily reach the udder, and with infants they will submit to being brought indoors that they may be placed upon the cradle (bed)." (B. R. Haddrup.)

A contrary opinion as to the value of this milk for babes is expressed by a few who state that the greatest objection to the use of goat's milk is its indigestibility, not only for the new-born but also for adults. The Milch-Zeitung (vol. 25, p. 716) says: "Most of the authors who are assured of the complete digestibility of goat's milk and who recommend its use above all others base their opinions on results obtained from feeding children several months old. * * * Ought not the great richness of casein which goat's milk possesses, as compared with woman's milk, make the milk harder to digest?" This paper points out the function of saliva in the process of digestion, and says that, in the case of the new-born infant, the role of saliva is almost nothing.

The chemist of the Philadelphia board of health has published two analyses of human milk, one when the glands were probably nearly empty and the other when full. The average of the two are given herewith and Hoffman's analysis of goat's milk and cow's milk added to the table for use in comparison. All are in percentages:

Element.	Human.	Goat.	Cow.
Albumin and casein	1.885	3.68	4.00
Fat	4.440	4.73	3.50
Sugar	5.850	4.50	4.50

It will be noted that in the matter of albumin and casein human milk falls far short of the goat, and the goat shows a considerably lower percentage than the cow's milk. There is not much difference between the fat content of human milk and goat's milk. Human milk is much richer in milk sugar than that of the goat.

This phase of the subject is so important that it will bear a somewhat lengthy quotation from Dr. O. G. Place, of Boulder, Colo., whose fields of observation have been New York City, Chicago, London, and Paris among the larger cities, and many of the cities of Italy, Arabia, India, China, and Japan. He says in a recent letter: "Anyone who will take the trouble to look up the data will readily see that in those countries where the goat is domesticated and its milk is used in the family there is very little tuberculosis, almost no scrofulous glands, and the infant mortality is decidedly less for those children which use the milk.

"There is certainly no danger in infection from either the milk or the meat of the goat. The following table will help us to draw conclusions along this line. This shows the infant mortality in the several countries named per 1,000:

United States, approximately	200
England	197
Asiatic countries (European children)	150 to 170
Italy	134
Norway	44

"The Asiatic countries do not have the sanitary enlightenment that is boasted of in this country and in England, and yet we find to-day not only the death rate lower in infants, but we also find markedly less tuberculosis among the adults. Asia is a goat country.

"Italy is a country noted for its unsanitary customs, and yet we find the infant mortality 66 per cent less than in our own country; and here, too, tuberculosis is seldom found. Italy is decidedly a goat country, and there the feeding bottle is scarcely heard of. Children that are not so fortunate as to be nursed by their mother find in the little Italian goat their next best friend. It is not an uncommon sight there to see an infant or small child drawing its dinner direct from the little goat, which has been brought onto the steps or into the house for the purpose.

"In Norway, which is a colder climate, and where people no doubt live more in harmony with sanitary laws than any other country in the world, we get the low death rate of 44 per 1,000. Here if a mother does not have nourishment for her child, some other mother nurses it for her as a rule; but where no mother is

HORNLESS BUCK. From Hilpert.

STARKENBURGER BUCK. From Hilpert.

at hand the milk of the goat is the universal food, and this is fed direct from the little bowl into which the goat is milked. Feeding bottles are unknown in this country."

What has been said in the preceding pages concerning the relationship of goat's milk to health has its application in the use of the milk more as a preventive than as a curative agent. The use of the milk and also the whey as a medicine, or curative agent, are considered at some length in a brochure issued by C. F. Reuss in Leipzig in 1763. He states that in the days of Hippocrates the milk cure was ordered to be taught in the medical schools as a curative of almost all breast affections and consumption; and he gives a long list of old physicians who used the cure, naming the disease treated by each. Some of the diseases mentioned are arthritis, nephritis, goat, whooping cough, scurvy, jaundice, diarrhea, worms, and inflammation of the liver.

Reuss states that these old physicians ascribed the curative properties of the milk to the kinds of herbs which the goats ate. He also says: "It is well known to the medical profession that the marked laxative quality and the characteristic smell of goat milk depends to a large extent upon the food which they get. And likewise it is easy to reach the conclusion that the efficacy and qualities of other drugs (than the laxatives) easily pass over into the milk. And right here also belongs the further statement that the goats give a rather large amount of milk, the whole spring, throughout the summer, and a part of the fall, to say nothing of the fact that the goats are much stronger and digest their food better than sheep do."

So much for the milk cure as a matter of history. While milk may not now be generally considered a medicine, it forms an important part of the sick-room diet. The relationship between milk and medicine is very close indeed. This is especially true of the milk of the goat.

Quantity.—Question: How much milk will a goat give? Answer: How long is a string? With goats, as with cows, so much depends upon individuality, breed, feed, and care that it is not possible to say how much milk goats will give. We may, however, arrive at an approximate conclusion if we study the animal with the above elements in mind.

A goat which gives less than a quart a day is not to be considered a good milch animal; if it yields 2 quarts it is a good animal, provided the period of lactation (which is discussed elsewhere) is not brief. In the European countries the goats which yield from 3 to 5 quarts a day are numerous and the period of lactation is a long one.

Indeed, it is stated in the German literature on this subject that many goats yield ten times their body weight of milk annually and exceptional animals as much as eighteen times their weight. This is very much greater than the yield of cows proportionately. On this point Petersen says: "In its form the goat exhibits, as it were, the complete type of a milch animal and by demonstration gives annually ten to sixteen times its own weight in milk and considerably more even, whereas, in the case of the cow, we must be well satisfied with five times its weight." This from Zurn: "The milk reaches ordinarily ten to twelve times the body weight, exceptionally eighteen times this weight, in each year. In the case of very good goats, 4 to 5 liters[1] can be produced for each kilogram[2] of body weight, or, at the least estimate, double what a good milch cow can show for each kilogram of her weight."

It is a good goat of any breed that will give 2 quarts of milk a day for seven or eight months of the year. One that will give more than this is specially desirable. The Angora goat, which is not considered a good milch animal, owing to the uncertain quantity and its covering of long hair, gives from 2 to 3 liters of very rich milk. The Nubian produces from 5 to 12 liters. The yield of the best goats of Switzerland is, on an average, about 4 liters per day. This amount is not produced without proper care and feed. To show how the yield varies, Dettweiler is quoted with reference to the annual yield per head of 24 goats in the vicinity of Altenburg, Geising, and Lauenstein:

9 gave 600 to 700 liters.	1 gave 900 to 1,000 liters.
7 gave 700 to 800 liters.	3 gave over 1,000 liters.
4 gave 800 to 900 liters.	

Ten animals in the city of Sebnitz were also reported upon, and their production annually was as here given:

2 gave 600 to 700 liters.	1 gave 900 to 1,000 liters.
2 gave 700 to 800 liters.	1 gave 1,100 to 1,200 liters.
3 gave 800 to 900 liters.	1 gave over 1,200 liters.

These goats were not of any particular breed, but they had been bred from selected parents, as are all the goats in Germany. This illustrates what may be done in our own country with the goats we now have if we handle them properly.

Petersen records the statement that one Langensalzaer goat gave 1,800 liters in one year. He also says that this breed has given a maximum daily yield of 10 liters.

Analysis.—It is not probable that any two analyses of the milk of any animal would agree; indeed, analyses of the milk taken at

[1] A liter is 1.0567 quarts.
[2] A kilogram is approximately 2.20 pounds.

different times of the day seldom agree exactly. The ingredients of milk are governed, first, by the species of animal, and then by the kind of feed it consumes, the time of day when the milk is taken, and by the part of a particular milking, whether the first part or the last, and other minor causes. Therefore an analysis of milk is only a general guide to its composition, and any variation between analyses does not prove that either or anyone of them is wrong. The analyses which are here quoted from several different authorities are not from individual goats, or from one milking, but are the averages of a number of analyses and are, therefore, a very good basis from which to form conclusions.

The following is from Renesse, and shows a comparison in percentages between goat's milk and cow's milk:

Element.	Goat.	Cow.
Water	85 50	87.25
Albumin and casein	5.00	3 90
Fat	4.80	3.30
Sugar	4.00	4.60
Ash	.70	.75

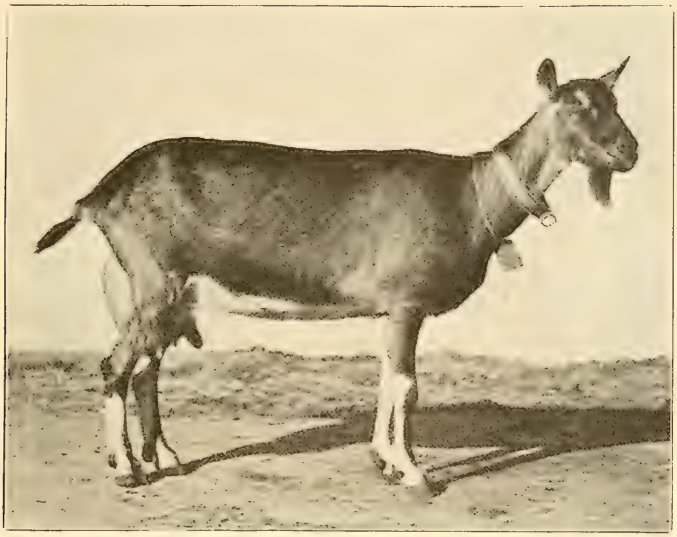
We find in the Oesterreichisches landwirthschaftliches wochenblatt another comparison in percentages between the milk of the goat and that of the cow:

Element.	Goat.	Cow.
Water	85.6	87.5
Dry substance	.7	.7
Casein	3.5	3.5
Albumin	1.3	.5
Fat	4.6	3.5
Sugar	4.3	4.3

Professor Hoffman gives the following percentages in comparing goat's milk and cow's milk:

Element.	Goat.	Cow.
Water	86.19	87.50
Albumin and casein	3.68	4.00
Fat	4.73	3.50
Sugar	4.50	4.50
Salts	.90	.50

The above three analyses are all of foreign goats. The total solids shown by them are, respectively, 14.50, 14.40, and 13.81 per cent. The two analyses of foreign cow's milk show, respectively, 12.50 and 12.50 per cent. The difference in favor of goat's



SCHWARZENBURG GUGGISBERGER DOE. From Hilpert.

HINTERWÄLDER DOE. From Dettweiler.

milk is one that is maintained in general in all analyses. An American analysis of goat's milk—one reported in 1896 by the chemist of the board of health of Philadelphia—shows the total solids to be 16.33 per cent. This indicates a very rich milk. The same analysis shows a percentage of 5.11 for sugar and of 5.85 for fat. This analysis, it should be stated, is of the milk of one goat and in all probability does not represent the quality of the American goats, as a whole. Who would not wish that it were so?

Quality.—The element of quality is shown in detail in the paragraphs under the head of "Analyses." This entire chapter has to deal with quality, but the reader is referred especially to the remarks under the head of "Its various uses."

Period of lactation.—This is a feature which, at first glance, would not seem to be appropriate under the head of milk; but the period of lactation is so intimately connected with the quantity which may be produced that it must be discussed here in order to best elucidate the subject.

The period of lactation, as in the case of the quantity, depends almost wholly upon the individuality of the goat, its ancestry, and upon the feed and care which it may receive.

In a general sense it may be said that the period of lactation is about 7 months. Many give milk 8 and 9 months, even 10, and some would continue throughout the year if permitted; but it is not well to permit the milk to flow up to the time of the birth of a new kid, as it works injury both to the does and the kid. On this point, we quote from a correspondent of the Landwirthschaftliche Zeitung: "A doe giving milk continuously during 9 to 10 months can be made to do so during 11 months and even for the entire year through by generous feeding and good feed in winter." A goat that is compelled to find most of its food, and if such as it gets is not very suitable for milk production, the yield will be low and the duration of lactation about 3 or 4 months.

If there is a milch goat industry built up in this country, it will be established to a large extent among the poorer people, who are unable to own and feed a cow; and these people will have need of a supply of milk throughout the year. Every such family should have at least two goats, and matters should be so arranged as to have them become fresh alternately six months apart. Thus each doe would drop kids but once a year, and they ought to be of such breeding and have such feeding as would insure a constant supply of milk.

Flavor.—People are inclined to believe many things that are not true, and one of them is that there is an inherent ill flavor in

the milk of the goat. Therefore, without parley, they decide that they have no use for either the milk or the animal. Briefly, it may be said that this is erroneous. However, in order to understand the matter, an explanation is necessary. If the goats are allowed to roam about and eat weeds and twigs and all kinds of vegetation at will while they are giving milk, the milk is apt to be strong, or of ill flavor. The tendency of the goat is to eat these very things at all times, and so it is but natural always to expect to note their influence upon the quality of the milk. On the contrary, if the animal is fed properly, with the purpose in view of obtaining palatable milk, no ill flavor is noticed. Switzerland is one of the greatest of milch goat countries, and travelers there always observe that the milk of the goat possesses a strong flavor. Bryan Hook, as well as some of the German writers, state that the animals there are not fed, but find it necessary to gather their subsistence from between the rocks on the mountain sides, where much of the vegetation is made up of aromatic plants. Hook further says: "The milk from goats fed upon what an English meadow or roadside yields has no flavor to distinguish it from cow's milk, except, perhaps, its extra sweetness and creaminess; in short, it is only distinguishable by its superiority."

Felix Hilpert, a well-known German writer on milch goats, says that milk with good taste may be obtained if the following points are scrupulously observed: (1) Good stable, dry stall, clean hands and bucket at milking time; (2) daily cleansing of the skin and washing off of the udder with warm water before milking; (3) the feeding of wholesome, pure, and "good tasting" (not strong tasting) food; (4) attention to fresh air in the stall, and, if possible, allowing the goats to exercise in the open air.

The Milch-Zeitung (vol. xxv., p. 699) says: "An after-taste of goat's milk, according to statements of veterinarians, should not exist, and, if any rich taste or smell should exist it must be traced to unclean stables or bad feed. Even cow's milk very frequently smells badly under these conditions."

Dettweiler says: "It [the milk] possesses a singular but not unpleasant sharp taste, the strength of which varies with the feeding and keeping. The better the feed, the cleaner the bedding, the better ventilated the stall, and the more painstaking the care, just so much more pleasing will be the taste of the milk. The goatish taste is always to be attributed to the lack of attention to one or more of these points."

Kloepfer says: "A scrupulous care of the skin itself is absolutely necessary even with the best conditions of bedding. If the

pores of the skin, which partly serve to bring air into the body and partly to emit excrementitous materials [such as perspiration] from it become filled with dirt and stopped up, on the one hand, metabolism suffers and, on the other, these materials remain in the body, the proper excretion of which is interfered with. Thus the rather unpleasant after-taste of goat milk, for the most part, is to be traced to the fact that the gaseous and liquid excrementitous materials can not pass from the body because of the occlusion of the pores of the skin and they therefore impart to the milk their unpleasant taste. The milk of healthy and cleanly goats has the same good wholesome taste that cow's milk has and excels it in the amount of fat and albumin contained. For these reasons it is imperative carefully to observe the following points: (1) To clean with a brush and comb the hair, first upward, then lightly downward, each day; (2) to wash the goats with soda water or soap suds on still sunny days in the spring before turning them out to pasture and in the fall before housing them, repeating the operation a few days later in each season. By this means all vermin is destroyed and many skin diseases prevented; (3) to look carefully after the cleanliness of the udder by washing it frequently and with great care and pains."

These opinions of writers of prominence and men of experience are given to point out the source of unpalatable milk and also the way it may be avoided. If a goat is fed all sorts of vegetable rubbish, it must not be expected to yield milk of the best flavor. Onions, garlic, aromatic plants, and all varieties of twigs and bark alone are not the best for good milk. We should not forget the philosophy of the old saw that "you can't make a silk purse out of a sow's ear." If the same sanitary practices obtain in the goat dairy that are now followed by the best cattle dairies there need be no fear of unpalatable milk. However, goat's milk has a characteristic taste which, it is said, is always distinguishable in some degree, but not so pronounced in the fresh state. This may be so far eradicated by good feeding, good care and cleanliness that it may be almost imperceptible. The taste can not be observed when the milk is used in coffee or in cooking.

The milk of the goat is nearly always pure white—very seldom having a yellowish tinge—and it is so thick as to lead one not familiar with it to doubt its purity and wholesomeness.

Odor.—Besides the flavor of the milk, which is discussed above, there is often a disagreeable odor. This may be due to one or more of the various causes, but it is not a natural characteristic and therefore, as in the matter of ill flavor, may be avoided by proper care. Dr. M. Aiken of the London Agricultural Gazette says that

GOAT OF MALAGA, SPAIN.

GOAT OF GRANADA, SPAIN.

Photos by Fairchild.

the slight odor which the milk sometimes possesses is not a characteristic of the milk, but is peculiar to the skin of the goat and is imparted to the milk externally. Zurn mentions the cause of the odor and tells how it may be prevented. He says: "It is admitted that goat's milk sometimes has the smell of the buck. Much can be done toward lessening this and toward its ultimate entire removal by furnishing a dry, sweet stall, bedded with lots of clean straw, by good care of the skin and by permitting the continuance as long a time as possible in the open air."

A German agricultural paper says that in consequence of uncleanliness and the lack of proper action of the skin there is a strong smell of a decomposition product—namely, caporic acid. The article continues: "With a view to the greatest possible diminution of the goatish smell of the milk, there are here given the following directions for good stable goats: (1) Short hair; (2) uniformity of color; and (3) goats without horns. The argument in favor of short hair is that the skin may be the better cared for. With reference to the color, it is claimed by some that the purer the breeds the freer they are from the disagreeable odor, and that a pure bred goat is of solid color. Most of the German writers state that goats without horns are the better milch animals. Why so the writer is unable to say. The paper referred to above intimates that goats with horns are more active, thus causing perspiration, and this gives rise to the ill odor. Hilpert says that hornless goats should give milk less strong to the taste than other goats, but does not give a reason for his opinion. He makes a point with reference to the odor of the milk, however, which breeders should note—namely, that "at times an individual characteristic is responsible for this, and from such animals offspring should not be obtained." He also says that if the goat's milk savors of the buck or of manure it is seldom the fault of the goat, but generally that of the owner.

Knowing, as we do now, the cause of the ill odor and how to prevent it, there is no reason why this characteristic should be quoted as an objection to the goat.

Concerning tuberculosis.—The question of the milk of goats being the carrier of the germs of tuberculosis will be discussed under another head, as it is one that concerns the animal's body as well as the milk.

Cost of production.—All estimates of the cost of producing milk are confined to German experiments. Of course, they can not be applied literally to the conditions in the United States, yet they indicate what may be expected. Dettweiler states that a goat which, under ordinary dairy conditions, yields 500

liters annually does so at a cost of 12 pfennigs[1] per liter. If the yield is 600 liters the cost is reduced to 8.3 pfennigs; a yield of 700 liters costs 7.1 pfennigs, and 800 liters costs 6.25 pfennigs each. He continues: "According to Dr. Lobe, a goat weighing 30 kilograms[2] needs a supply of hay weighing 1.05 kilograms, and gives on an average of 1.72 liters of milk at 12 pfennigs per liter; thus the goat converts 50 kilograms of hay, by means of the milk given, into a value of 9.80 marks; an evidence of the fact that the goat is a good utilizer of food. In the same way a cow weighing 300 kilograms, with a daily food supply of 10.5 kilograms, must give nearly 17 liters if she would utilize the food as well as the goat. Under very many circumstances the keeping of two or three goats will be more profitable than that of one cow, for with the feed that a cow requires one can keep eight goats at quite an additional profit and at comparatively less risk of loss."

Description of a Good Milch Goat.

The points of this description are those which are considered important in Europe. There seems to be no reason why the best milch goat here should not answer in all respects to the best type there. The goat should be hornless, short haired and of solid color. Long hair is an objection only as it is a nuisance at milking time and makes the work of keeping the animal clean very difficult. The animal should usually present a lanky appearance, with broad muzzle, clean-cut head, graceful neck, deep in the stomach rather than broad. The chest should be broad and deep. The udder is hard rather than soft and fat. The size of the udder will depend upon the number of years the animal has given milk. In some of the old does, especially of the short-legged Maltese, the teats sometimes touch the ground. A very excellent description and one full of suggestions is that of Hilpert and is given herewith: "In a good milch goat the following points are to be described: A long body, growing larger at the hinder parts and beneath, neatly rounded form, a deep and broad breast, short legs, broad buttocks, wide but filled out 'hungry hole' (the depression in front of the hip bone), a neck that is not too long nor too thick, a light, broad head, wide mouth and good udder. The udder should be of considerable size. Only those goats can give plenty of milk which have a bulky, well-developed milk gland; that is, a large udder. But it is not always the case that a capacious udder signifies a high milk yield. The amount of glandular tissue in the

[1] A pfennig is one-fourth of a cent.
[2] A kilogram equals, approximately, 2.20 pounds.

udder can be augmented by the surrounding flesh and fat, and then the udder is spoken of as a fleshy or fatty udder. A large udder is, then, a favorable sign of an abundance of milk when it is a genuine udder. A fatty udder feels soft and full; its skin is generally somewhat thicker, sparsely covered with long, coarse hair; does not wrinkle after milking and diminishes only slightly in circumference. A genuine milk udder feels tight and as having kernels in its upper portion; its skin is thin and tender, covered with short, fine hair, and forms very perceptible folds and wrinkles, which fall together after the milking is done, if the condition of the udder is not too tense. Moreover, the blood vessels course along very noticeably on account of the thin skin when the udder is filled—a condition not present in the case of a fatty udder. A good milch goat should have a fine, thin skin, which is best examined over the ribs, and it should be covered with fine (not bristly), smooth, glistening hair. That the absence of horns possesses an alleged influence in making the milk mild in taste has been spoken of before. When all these characteristics coincide it is certain that one is dealing with a good milch goat."

In the matter of selection one should buy only well-bred stock. Goats designed for breeding should be descended only from such animals as gave an abundance of milk. In this connection it is well to remember that the milk yield is a quality which is inherited not only through the mother goat, but through the buck also, and handed down to the young. If both the males and females be descended from milch-giving animals, then it is of the utmost probability that the offspring will be blest with an abundance of milk later on.

An American Milch Goat Suggested.

Having in view the great difficulty that will be encountered in efforts to import foreign breeds of milch goats, it occurs to the writer that the people of the United States who are interested in the question may find it necessary to develop a strain of milch goats from the stock already available. Everybody calls this stock "common goats," as, indeed, they are. Mrs. Roby has patriotically suggested that the term "common goats" be discontinued and "American goats" be substituted. But a change in name will not change the animal, and it will still remain a common animal, not only in the United States, but everywhere. Let us, rather, adopt a further suggestion of Mrs. Roby and by the use of our common goats as foundation stock develop an animal that shall produce a good quality of milk; and, so soon as some breeding characteristics are fixed, call the new animal the "American goat."

MALTESE GOAT. Raised in Tunis.

NUBIAN GOAT. Photo by Wm. G de Coligny

Such an outcome is not an impossibility by any means. English breeders soon learned that the purebred milch goats from the continent and the Island of Malta would not thrive in their climate; so they began crossing with their common goats, with the result that they now have a very good milch animal which they name the English milch goat. In our own country Daniel F. Tompkins of Jersey City, N. J., has met with very good success in efforts to develop such an animal as suggested here. Mrs. Roby, who has already been mentioned, is making efforts without regard to cost in the same direction.

Breeding and Kidding.

Milch goats as a rule are very prolific animals. They seldom drop fewer than two kids, and some breeds drop as many as four at a time. The Nubian, one of the best milch goats known, has had as many as eleven kids in a year. It is well known that Angora goats will breed but once a year, but other goats breed very soon after kidding; and, as the period of gestation is only from 155 to 157 days, their increase may be quite rapid.

The buck.—First, the buck should be from a milk strain and himself have the characteristics of a milch animal. He should have a pedigree showing ancestors of milk propensities; even then, if upon trial he fails to transmit the milk characteristics, he should be dispensed with. He should be killed for the good of the industry.

The Question of Feeding.

The thought will no doubt come to many people at once that the best and cheapest manner to feed milch goats is to turn them upon brushwood and weeds, where they can feed as Angoras do. While this will prove to be a feed very much relished by the goat and at the same time prove an effective means of destroying the brush and weeds, it will be observed that the milk supply will diminish in quantity and the palatability will be greatly affected. Such a location will not answer for a goat dairy. The goat is a single-purpose animal; she can not produce good milk and destroy brush and weeds at the same time. She must be regarded as a milk-producing machine and fed such things and in such manner as will enable her to do the best at the pail.

In a general way it may be stated that eight goats can subsist and yield a good flow of milk upon the amount of feed that is required for one cow. It is proved by experiments in Europe that the goat makes much better use of its feed in producing milk than

does a cow. Considering its proportionate weight, the goat is the greatest milk producer of all domestic animals.

Some writers state that the average amount of hay required annually for a milch goat is about 300 pounds; but in an examination of experiments where large milk production was the object in view it is shown that some goats will consume as much as 700 pounds. Let us be generous and allow our goats 500 pounds to eat; if we are not careful we shall waste that much or more and charge it against the goat. For the milch goat hay is indispensable, winter and summer. Without hay goat keeping is scarcely possible, because it can not be displaced by any other food. Of course, an abundance of dry fodders will answer the same purposes as the hay. Kloepfer says: "From my experiments, which I have conducted in the past two years upon my experimental animals, one must figure on at least 3 cwt. of hay yearly for each mature animal. If one can obtain more of course it is so much the better. As a means of saving the hay it is suggested that it be cut up and fed in a narrow rack and mixed with straw. By this means the animals will be prevented from tramping the feed under foot. It is best in the morning to feed half of the day's ration of hay, mixed with equal amount of straw, and after this to give water which in severe weather has been allowed to stand in a warm room or in the kitchen. The offal from the kitchen serves as the usual noon meal, which should be given not with, but without, a large amount of liquid."

Good hay, especially clover hay, exercises a stimulating influence upon the digestive organs and serves as an active element in the production of milk. Fresh hay, which has not yet undergone the sweat, is difficult of digestion and easily induces bloating. Old, dusty hay which has lain more than a year is tasteless and provokes shortness of breath. The best food for goats is found in the pasture "where nature has spread the table"; but before they go out and after they return from the pasture hay should be given them.

Bran is an excellent feed; its use will depend upon its cost. The daily ration may vary between one-half and three-quarters of a pound. Dampen the bran with a little salt water. The morning and evening portions may contain the solid materials from the kitchen slops, such as potatoes, carrots, turnips and bread crusts. Malt is recommended where it can be had regularly and at reasonable cost. It is an excellent milk-producing feed. It should not be fed when sour. Dry malt (which has been preserved for a year) is also good for milk.

Oats and barley are good. Green oats are especially good for kids at weaning time.

Linseed cake meal may be fed in amount from 50 to 75 grams daily as an auxiliary feed. Its influence upon digestion and nourishment is excellent. Kloepfer says: "It is absolutely invaluable before delivery. When, on account of its digestibility and ready assimilation, it is a prophylactic against milk fever." A breeder of many years' experience declares that out of 100 cases of milk fever, 50 of which used to be fatal, now his herd is almost free from it because of feeding with linseed cake. This precautionary method is so simple and reasonable in price that all ought to be able to employ it. If, by reason of drouth, soiling is necessary, leaves, vegetable refuse, peelings of the apple or potato, bread crusts or stale bread, if they are sweet and clean, will be all the feed that is needed. All goats, however, will not eat the same food, and the feeder will have to study the appetites of the individual animal. Frequent feeding and a variety of food in winter will be found beneficial.

Fencing and Housing.

The fences and houses required for milch goats are very much the same as those required for dairy cattle. While the goat does not jump, except when trained to do so, it will climb and creep just where one would not expect it. Goats should not be tempted with a poor fence or one that offers any opportunity for climbing. If such opportunities are offered, the garden, shrubbery, and fruit trees are sure to suffer in consequence.

The plan of a very convenient house is shown in Hook's excellent little English work, "Milch Goats and Their Management." The stalls are very convenient; the rack above for the hay is easily accessible to the animal, and yet permits of no waste; the slatted floor favors cleanliness; if for any reason the goat should not be tied—at the time of kidding, for instance—the box stalls are available; a loft immediately over the stalls holds the forage, which may be fed directly to the rack below; a hopper is provided for grain or soft feed. Any goat house should be ventilated, for goats must have an abundance of fresh air.

A goat house must be comfortable in winter, as all short-haired breeds suffer much from the cold. It must not leak rain at any time.

There should be a yard in connection with the goat house where animals may exercise on warm days in winter season.

TYPICAL MALTESE MILCH GOAT. A common street scene in Malta. Photo by David G. Fairchild.

The Operation of Milking.

The act of milking by the milk vender in European countries and also in our insular possessions is usually done on the street at all hours of the morning or evening. The vendor drives his goats from door to door, and at each one draws the amount of milk desired. The better way, as our own people will at once recognize, is to have a place near the goat house for milking, just as we have an established place for milking the cow. Under no circumstances should milking be done in the stalls or in that part of the house where the stalls are located. The act of milking is done from the rear, as is shown in the illustration of the Maltese goat.

All authorities agree that goats should be milked three times a day. This must be done regularly as to days and hours, if the goat is to be kept in milk—"in profit," as they say in England. This is an important point; a disregard of it is apt to render futile all other efforts in the way of breeding, feeding, and care.

Kindness and gentleness is now a recognized necessity in the best cattle dairies. These characteristics are even more necessary with goats. On this point Von L. Albrect is quoted: "Milch goats will be particularly gentle and of kind disposition when handled and cared for, so far as possible, by the same person. To this end the milking must be done with regard to gentleness and regularity, and with the closed hand so far as possible. The strokes and tugs must be performed with care. The milking is done best by a stroke directed from above downward."

Some excellent advice is given by Renesse as follows: "Before beginning to milk the two teats are to be washed off with lukewarm water and then dried off with a soft cloth, also the udder is to be stripped a few times from above downward. It is advisable that the animal be milked by one and the same individual with clean hands at regular and definite times. The milk pail is to be entirely sweet and clean. Milking must not be done in the stall. Tuberculous persons must not be allowed either to expectorate in the stable or, much less, to milk. That the milk may not depreciate in taste it should be put away in a suitable place. A statement of the amount of milk given daily should be kept in a book by dates, in liters, in order to have an accurate account as to the profit."

Milch Goat Dairies.

Since there is almost universal indorsement of goat's milk for infants and invalids, and since the cost of keeping is so much less than the keeping of cows, it would seem that a goat dairy would prove a success, especially if it is in proximity to the large cities.

Instances are known where the milk has been sold in limited quantities at prices ranging from 12½ cents to 25 cents a pint. It may not be that such prices would be maintained, but there can not be a doubt that a much better price could be obtained than can be had for cow's milk.

After a milch goat industry shall have been established in this country other matters in connection with it will arise for attention. The matter of condensed milk will be one of the first. Thousands of infants are now compelled to live during their first few months on condensed milk of cows, and it is not the best food for some stomachs.

The Cheese.

The cheese that is made from goat's milk is considered very choice and always brings good prices. Some of the varieties quite well known in the United States are the Roquefort, Ricotto, Schweitzer and Altenburger. It is stated that on an estate near Lyons, France, 12,000 goats are kept in flocks of 40 to 60 for the purpose of cheese manufacture.

The goat cheese made in the vicinity of Mount d'Or enjoys a worldwide demand, and there are employed at this place about 15,000 goats. We are informed that the annual production of cheese there is valued at 1,500,000 francs ($289,500). The French goat cheeses worthy of special mention are Fromage de St. Marcellin, St. Claude, Cheveretin, Gratairon. The first one is a combination of the milk of the goat and the sheep.

The strong taste and odor of goat cheese are qualities very pleasing to many. In Norway a goat cheese called Hoitcost is quite a favorite. On this account the French as well as the German, especially the Dutch and Swiss, dairymen have been in the habit of making cheese of an especially pronounced odor and flavor, and, in pursuit of this habit, some of them have used the milk of the goat in part with that of the sheep and the cow in the making of cheese. But while in some instances the milk of the sheep is used wholly as the basis of a special kind of cheese, that of the goat is only used when mixed with the ewe's or cow's milk, simply for the purpose of securing the special flavor of it. And as the special kinds of cheese thus made find a market in our large cities to considerable extent, it is quite probable that the making of this kind of cheese may become an established and quite profitable industry. And, in fact, in view of the great enterprise and engenuity of the American citizen in all the business of life, it may easily become so to an enlarged extent when goat's milk cheese shall be offered in our markets.

With reference to the manufacture of goat's cheese, Renesse gives the following: "The milk is treated in a kettle, warmed to 25° to 26° R., and, while being stirred evenly, is brought to coagulation by the addition of rennet. By this means the socalled curd is separated out of the whey. The curd is then manipulated with a strainer and the whey allowed to run off. When the curd after several hours has become dry, salt and caraway seed are intimately mixed with it and it is made into small cheeses. These little cheeses are to be placed on racks in the cellar to dry and are turned daily. After about fourteen days they are ripe and ready for use. The cheese takes on an especially fine taste and sweet odor if, after a long period of ripening, it be laid in the dried leaves of the sweet-scented woodroof. As a rule, 1 kilogram of cheese can be obtained from 10 liters of milk."

The Butter.

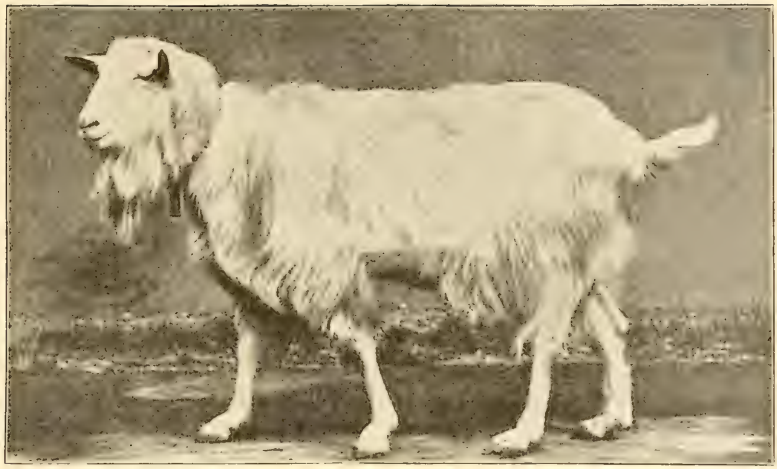
There is nothing about goat's milk to recommend it for butter making, although in those countries where milch goats are common it is made frequently, but not extensively.

There are several reasons why it is not satisfactory, and these will be mentioned here, but not discussed to any extent. Goat's milk is very slow to cream, a condition due to the fact that the fat globules are very small and consequently held much longer in emulsion. Owing to this condition the ordinary method of separating the cream by skimming after the milk has been set is not successful, as only a portion of the cream will have separated in the time allowed. According to Zurn, 50 kilograms of milk, when skimmed in the ordinary way, yield only 1.5 to 2 kilograms of butter.

Good goat's butter is usually white, rarely of a yellowish tinge, tastes sweet, and is very fat; because of the last characteristic it is softer than cow's butter. If it is used in its fresh state the taste is pleasant, particularly if it is freed by much washing of the peculiar taste which ordinarily clings to it, but which in a degree is pleasant to some. This taste returns again, however, if the butter is set aside for several days. Goat's butter becomes rancid very soon and very easily. It can be used as cooking butter only in a fresh state.

The Milch-Zeitung (1893, p. 756) published an analysis of goat's butter, which is reproduced here:

	Per cent.
Water	8.2
Fat	86.5
Salts and ash	3.7
Proteids	0.9
Carbohydrates	0.7
	100



SAANEN BUCK. From Wilsdorf.

SAANEN DOE. From Wilsdorf.

The low content of water is especially noticeable, being but 8.2 per cent. Cow's butter of good quality carries as much as 12 per cent.

The Whey.

Goat's whey is highly recommended by foreign authorities on account of its medicinal and nourishing properties. This paragraph will deal wholly with their opinions. Zurn says: "Goat whey is used for medicinal purposes and is recommended especially for diseases of the lungs for those suffering from bronchial catarrh, for weak anemic persons suffering from innutrition, and also for weak consumptives. The whey is easily, quickly, and completely separated from the milk." The same author publishes the following approximate analysis of the whey:

	Per cent.
Fat	0.02
Sugar	4.969
Salts	0.665
Albumin	0.581
Water	93.765
	100

The composition of the ash is as follows:

	Per cent.
Potassium	44.58
Sodium	7.18
Calcium	5.99
Magnesium	2.48
Phosphoric acid	13.78
Sulphuric acid	2.42
Chlorine	30.41

The whey has a laxative effect on most people, a fact easy of explanation when the composition of the ash is considered. Zurn says: "The abundant amount of acid phosphate of calcium, which is presented in easily assimilable form in goat whey, has the power to influence favorably the upbuilding of the bony structures; the amount of potassium present, the activity of the blood and circulation, especially the heart. By means of its sugar the whey supplies carbohydrates in composition easily to be assimilated and which serves as a means of strengthening the respiratory activity. The amount of water contained in whey has the power to assist in carrying off the non-assimilable materials which are present, especially in the blood of those who are ill."

The consideration of whey will close with the following summary of its benefits, as given by Dr. H. May, physician and director of the royal sanitarium at Kreuth, Germany: "It is my opinion that the whey is of advantage in consumption because the sugar which it contains checks the albuminous and tissue waste and its salts compensate for the loss of inorganic matter as the result of increased bronchial and mucous secretion. The tests of the physio-

logical and therapeutic value of the whey brings us to the conclusion that it is a valuable nourishment and healing agent which can take the place of other means of cure and we have no ground to fear that all the whey-cure institutes will be transformed into milk-cure institutes. While it is not possible to draw a hard and fast line of difference to say how many of the results we see in the whey-cure institutes are to be credited to the account of the whey and how many to other agents, especially climatic conditions, I learn from the history of my cases that I can attribute them in very great part to the healthy therapeutic action of the whey.

"When we gather together the conclusions of what has been said they are these: (1) The salts of the milk and milk sugar are largely responsible for the physiological and therapeutic value of the whey.

"(2) The sugar limits by its disintegration the further breaking up of the glycogen fats and albumin in the body and serves in this way for the maintenance of the body aright and puts the body in shape to take on more fat.

"(3) The principal value of the sugar for our bodies is seen best in emaciated people when the possibility of keeping up nourishment is lessened and the life of the cells is hindered. Here the sugar acts similar to alcohol as a maintainer of strength.

"(4) Though it is not absolutely essential to have a surplus of salts in case of a sound, healthy body, it is very often that the presence of these salts acts to dispel pathological conditions in a remarkable degree when the body is sick.

"(5) This is especially the case in fever, in suppuration, exudates, continuing catarrhal secretions, profuse expectorations, etc.

"(6) Besides this compensating influence, the salts of whey exercise in the body a diuretic action and serve as a mild laxative.

"(7) A specific action of whey in the diseases of the respiratory organs is not worth while to mention when we know its physiological and therapeutic action.

"(8) Whey contains by careful preparations no lactic acids; its milk sugar is not transformed into lactic acid in the intestines.

"(9) From the irritation caused in these organs by the action of lactic acid we can see how valuable the elements of whey (salts of sugar) are, inasmuch as they are absorbed unchanged.

"(10) Whey is a valuable means of nourishment and healing, which can be substituted and placed by the side of all the other means of cure.

"(11) For the transformation of all the whey institutes into milk institutes we are not ready for the reasons cited."

Immunity from Tuberculosis.

Whether or not goats are immune from tuberculosis (or consumption, or phthisis) is a question of the greatest importance, since those who advocate the keeping of goats for milk lay much stress upon the healthful qualities of the milk, especially in its relation to tuberculosis. If it were true, as is often stated, that goats are never affected with tuberculosis, they would no doubt be regarded as the most valuable of the animal kingdom to mankind. This would be the case because milk is the first food of man, and he is dependent, to a large degree, upon it throughout life; and we are assured by the medical fraternity that the dread disease of tuberculosis is transmitted more often and more readily by cow's milk than by any other cause. Hence, if there were a domestic animal which would prove to be absolutely immune from this disease it would be one of the greatest boons to humanity. However, the goat is not entirely immune, as we shall see from the testimony of several who are thoroughly informed on this matter; but it may be safely said that it is practically immune from tuberculosis and that a very few goats only are affected.

The subject of milch goats is a new one to the United States and our people, who always desire the opinions of men of experience, demand the fullest information before formulating their judgment. For this reason the opinions of scientific men and others in Europe are quoted here in reference to the goat and its relation to tuberculosis. Hook says: "Undoubtedly the most important of all the qualities of goat's milk, especially in its relation to its adaptability to the feeding of infants, is its immunity from the danger of carrying the germs of tubercular disease."

A writer who signed himself "Sirgar" to a recent article in the Rural World, a person who writes with such force as to exhibit an acquaintance with goats, says: "I have seen this statement questioned—I do not know by what authority—but some years ago the British Medical Journal boldly declared that goat's milk is not liable to tuberculous infection; and in support of the statement quoted the greatest living authority on bacteriology, the well-known Professor Nocard, whose researches have proved so valuable in many directions to the stock keeper. Professor Nocard states that 'out of over 130,000 goats and kids that have been brought to Paris for slaughter at the shambles of La Villette every year, the meat inspectors have failed to discover a single case of phthisis.' This testimony should be sufficient to decide the ques-

tion and its value would be little disturbed by the discovery, if it were made, that the goat is not immune. For all practical purposes the animal, when kept under healthy conditions, is free from the dreadful disease from which very few [cattle] herds in the country can claim to be exempt."

A German agricultural paper indorses goat's milk because of its "anti-tubercular properties, insuring a pure milk yield"; and the paper continues: "Since Lobe, Rhode, and others ascribed to goats an almost total immunity from tuberculosis, Koch makes the statement, in his first study concerning tuberculosis due to infection of cow's milk, that recently there are well-authenticated cases recognized in the literature due to inoculation by cow tubercles or in consequence of rearing goats on tuberculous cow's milk."

Hilpert says that since the goat is much more healthy than the cow and sheep, tuberculosis (which can be transmitted from them to man) attacks it very rarely, and so its milk is very much better and is especially adapted to children. Dr. A. von Renesse says, with reference to the milk of the goat, there need be no "fear as to the transmission of tuberculosis." Dr. Schwartz, medical counsellor from Cologne, in an address at Frankfurt (1896) before the Association of German Naturalists and Physicians, directed the attention of the convention toward goat milk as a food for children because goats rarely have a tendency to tuberculosis, and even when they have it they become infected by coming in contact with tuberculous cattle.

A few references follow to show to what extent one may expect to find tuberculosis in the goat. The first is from Herr Hoffman, professor of animal breeding at the Royal Veterinary High School, Stuttgart, Germany (1898), who says: "While the statement is not entirely true that goats are absolutely immune from tuberculosis, yet, of 1,500 goats publicly slaughtered in one year only 0.6 per cent were affected. This bears no comparison to the prevalence of tuberculosis among cattle. For example, in the slaughter house at Kiel, Germany, in 1896, 41.03 per cent of all slaughtered cattle and 45.82 per cent of all cows were found to be tuberculous."

This from Dettweiler: "In the kingdom of Saxony, according to a report concerning veterinary affairs for the year 1894, it is stated that out of 1,562 goats slaughtered only 10 (0.64 per cent) were found to be tuberculous, of which 2 were destroyed, 1 was kept under observation and 7 were found salable. In Prussia in 1899, in 381 slaughter houses 47,705 goats were killed. Of this number only 148 head (0.41 per cent) were infected, either gen-

erally or locally. This result must be the more astonishing because the goats, with only a few exceptions, were kept under conditions eminently favorable to the spread of tuberculosis. Petersen, quoting these same figures, says that the goats ran freely in the cattle sheds, ate out of the racks with tuberculous cows, and, owing to their well-known proclivities for mischief, took hay out of the mouths of the cattle, whereby they exposed themselves to the greatest possible infection. Hoffman continued as follows: * * * "Of 4,146 goats slaughtered [in Saxony] in 1899, only 25 were found tuberculous. Of these 3 were destroyed and 22 passed inspection—that is, were salable."

The opinion now quoted from the Deutsch Landwirthschaftliche Presse (vol. xx, p. 833) is on the other side of the question: "Assistant Eichhorn informs us as follows in 'Report of Veterinary Science in Imperial Saxony,' concerning the appearance of tuberculosis in goats: 'There was a goat (in a large herd of 28 head) which had been brought for treatment and which, after its death, which soon followed, was found to be tuberculous to a high degree. This made it imperative to inoculate the entire remaining 27 head with tuberculin. In 18 of these, in consequence of the inoculation, a rise in temperature occurred of 1° to 2.5° C., and only in 9 did the increased temperature amount to less than 1° C. (0.6° to 0.9° C.). Because of this result 68 per cent of all the goats had to be retained on suspicion of being tuberculous, and only 32 per cent were to be looked upon as probably free of tuberculosis. The owner could only make up his mind to have 3 slaughtered, of which 2 were suspected of being tuberculous and 1 was probably free of the disease; the result justifying the conclusion that the diagnosis was correct. This shows how necessary a greater degree of care is in the use of goat's milk as food in the milk cure.'"

To discuss the tuberculosis question is a delicate matter and one which only the medical man and the scientist would dare to venture upon. The writer must be content with a presentation of the views of others who have made the question a study. There are, however, some conclusions which may be drawn from the quotations given above—namely, (1) goats will contract tuberculosis; (2) they do so with some difficulty, thus showing that they are what may be termed highly resistant to the disease; (3) they are not likely to contract the disease if in good health and ordinary methods are employed to prevent exposure.

Diseases of Milch Goats.

Milch goats are subject to the same diseases as the Angora breed. The reader is therefore referred to the chapter on the diseases of the Angora goat for information on this subject.

Some of the Breeds.

There are a great many different breeds of milch goats. The number is augmented by many cross breeds. It would subserve no useful purpose to give an account of all these here, or of even a considerable number of them. We shall be content with some general remarks about a few breeds that have received in their native home land high commendation as milch animals.

The Malta goat.—It is probable that in no country has the raising of fine milch goats been brought to such a degree of perfection as in the Island of Malta. The population of this island is about 200,000 and the people there rely almost wholly upon the goat. The number of goats there is very large, but no one seems to know just how many. There are various estimates ranging all the way from 12,000 to 30,000. They wander about in small flocks. David G. Fairchild, to whose courtesy the author is indebted for the Malta pictures, notes that they feed largely on scraps of all kinds, such as they can pick up on the streets. It is not strange that this method of subsistence gives to the milk a strong, unpleasant flavor, and on this account the English contingent prefer condensed milk from England and the United States. There are no regular grazing fields for goats, such as are known in the United States, but every morning the flocks are driven out along the roads and uninclosed plots along the sides of the hills, where the goats pick up whatever they can find in the way of weeds, but there is seldom any sort of grass. Sometimes they get the leaves from the maize and the prickly pear. At night, when they are driven back to shelter, their day's feeding is supplemented by the carob bean. The proper winter food for these goats is the chick pea, broad bean, and sulla, all of which are grown all over the island. How these animals can give so much milk upon such feed as they get is a matter of frequent remark by foreigners who visit Malta.

The amount of milk produced varies, of course, with the animal and with the period of lactation. Hon. John H. Grout, U. S. Consul at Malta, says an average goat produces 4½ pints of milk per day, and sometimes as much as 5 pints. Fairchild's information is that the average yield is between 3 and 4 quarts a day. Often the owner has an income of 16 cents a day from a single goat.

The Maltese goats are about 2 feet 6 inches in height, while

they will often weight 100 pounds. They are usually hornless, and many that grow horns are dehorned. The predominant color is white, although there are many of other colors—red, brown, and black. The ears are moderately long, and horizontal. The udders are very large, oftentimes nearly touching the ground when the animal stands. It is said that the milk characteristic of the breed has been so perfectly developed that nearly every doe kid becomes a good milker. There are two varieties of Maltese goats—the long haired and the short haired. The hair of the former is often 4 to 5 inches long.

The prices of good Maltese milkers range between $10 and $25.

They have been imported into England but have not thrived there. In Malta it is asserted that they never do well when exported. There is no record of any importations into the United States.

The Toggenburger goat.—This breed is from the Toggenburg valley of Switzerland, a district forming a considerable portion of the Canton St. Gallen, in the northeast section of the republic. It is of the hornless type, though occasionally one is found with horns; the hair is medium long, and usually solid fawn color, but sometimes dark-brown mottled. The average weight of this animal is about 121 pounds. The Toggenburger has a somewhat slender body, and, except as to its larger size, very much resembles the Appenzeller, which comes from the same section of country and is sometimes considered by some not well informed to be of the same breed. Hook says: "The general appearance of the Toggenburger is attractive; the color is a peculiar shade of brown, or mouse, color, and with white marking distributed with perfect regularity. The legs below the knees and hocks should be white, and a white streak runs down either side of the face and round the ears. The head is without horns; the ears are pricked and of moderate size, as is the case with all the Swiss varieties, and the face bears a remarkably intelligent, gentle expression."

Professor Anderegg, who was secretary of the Swiss Agricultural Society, in a monograph upon Swiss goats, speaks of the Toggenburger as one of the most valuable of Swiss goats. He also says that she is easily acclimatized, and will thrive as well in the stable as on the hills. Hook also says of this breed in England: "The Toggenburger goat is, in my opinion, by far the most valuable and the best suited to our climate of all the pure breeds that have been introduced into this country, and, having now become fairly common and well established with us, is the breed I should unhesitatingly commend to the attention of goat

SWISS MILCH GOAT. (Toggenberg Breed.)
Photo by Will C. Clos.

keepers." This animal is always somewhat lean and bony looking when giving milk, as it seems to throw all the strength of its constitution into the production of milk.

Anderegg says the daily milk product of this breed is about 4[1] liters. This must be regarded as a very heavy yield.

The president of the British Goat Society is quoted as authority for the statement that a Toggenburger in England yielded a fraction less than a gallon per day. Although not equal to 4 liters, it is probably more than the average daily product of a year.

In discussing this breed, Hook points out an important feature which, in the opinion of this writer, is applicable to all breeds, namely, that the high position occupied by the Toggenburgers as milk producers has been attained by the careful selection of individuals for breeding, and from their offspring, preserving those only for breeding which have proved themselves to be good milkers. This method of practice will certainly lead to definite results if intelligent selection is made. It may be surmised, therefore, as has been stated in discussing the Saanen breed, that there are in Switzerland many Toggenburgers which are useless as milch goats. So, while it may be true that this breed has been so handled as to possess more definite or fixed characteristics than other breeds, it is by no means certain that any Toggenburger doe will prove herself to be a good milker.

There are very few goats of this breed in the United States; indeed, there is but one record of importation. On July 12, 1893, W. A. Shafor, of Hamilton, Ohio, now secretary of the American Oxford Down Record Association, imported through the port of New York 4 head of Toggenburgers. These were located on a farm in Indiana. From correspondence with Mr. Shafor, it is evident that there has been some difficulty in acclimating them, for as late as in 1898 he wrote that the purebred stock had reached the number of 7 only. Half-bloods and three-quarter-bloods had proved themselves, like the pure breeds, to be good milkers. This fact tends to confirm the statement of Hook that "they have a remarkable power of transmitting their characteristics to their offspring, many half-bred animals showing all the distinguishing peculiarities of the race."

The Saanen goat.—The Saanen breed of goats, according to Dettweiler, takes its name from the Saanen valley in Switzerland, but it is quite commonly kept also in the upper Simmen valley of the same country. The pure Saanen goat is rather large, of dainty white color, and is hornless. The neck is proportionately long, shapely, and not very heavy; breast well developed; udder

[1] A liter equals 1.0567 quarts.

very pretty, as a rule; milk production is plentiful under good food, averaging 4 quarts per day. Wilsdorf says the milk of this breed is, like that of most breeds, pure white (in rare cases a yellowish white), and somewhat thick in consistency as compared with the milk of the farm, or native, goats of Saxony, and that it is characterized by a positive pleasant taste.

The statement of the milk production is upon the authority of Anderegg, but Dettweiler says that, so far as he is able to form an opinion from his own observation, the quantity is too large for the breed taken as a whole. Anderegg was writing of the Saanen goats in Switzerland, and Dettweiler acknowledges that in all goats in Switzerland the production of milk is noticeably higher than in Saxony, "where no one bothers himself about the goat."

Petersen says concerning this breed: "The quantity of milk given when the animal is fresh is stated at 3 to 4 liters, increased in isolated cases to 5 or 6 liters; and it is also true that in other cases it remains under 3 liters. The average daily quantity for a lactation period of 9 to 10 months is estimated as a rule at 2 liters or a little over; so that the annual production runs about 600 liters.

Germany imports large numbers of Saanen goats, not alone on account of their milk yield, but because of their becoming easily accustomed to the climate and the feed, and also because of their clean white color. The result of this large demand has been known to raise the price of a doe to 100 marks and of a buck to 200 marks.

Doctor Kohlschmidt, director of the agricultural school at Freiburg, Saxony, conducted experiments in 1896 and 1897 with various goats to test their capacity for milk production, and one of his conclusions was that the Saanen goats, which had been imported into Saxony in 1894, with the same feed and methods of keeping that the German goats had, could be classed as anything but better than the Saxony goats, as regards both quality and quantity of milk.

Wilsdorf, however, after stating that the Saanen goats, after kidding, give from 4 to 6 liters of milk daily, and that "this yield happens not occasionally but as a rule in the Saanenthal," probably gives the reason why these goats in Kohlschmidt's possession proved to be so inferior. He says that the owners of the Saanen goats are not so lacking in foresight as to dispose of their best milch goats, for by so doing they would soon have competitors in a lucrative business. Besides, he calls attention to the dependence of the Swiss upon their goats, and for this reason also they will not sell the best animals out of their stalls. For the most

part those which are exported are fit only for slaughter. An idea of the enormous exports of Saanen goats may be had when one learns that there were shipped out of the Saanenthal and the immediate vicinity in 1893 something over 50,000 head. "We have seen exports of goats from Switzerland purchased at a large total cost which would have been considered almost worthless to an intelligent breeder." (Wilsdorf.)

But let us return to Kohlschmidt's experiments giving the results as they are quoted by Petersen: Ten Saanen goats were employed—7 of them from 3 to 3 1-3 years old, and 3 from 2 to 2½ years old. The average quantity of milk produced during a year by these 10 goats was 678.41 liters per head. The largest annual production was 911 liters, and the smallest production was 421.94 liters. The following statement shows the annual production per head:

2 gave over 400 liters (423 quarts).
3 gave over 500 liters (528 quarts).
1 gave over 600 liters (634 quarts).
2 gave over 800 liters (845 quarts).
2 gave over 900 liters (951 quarts).

Animals of this breed which were 14 months old gave an average during their first lactation of 509.72 liters per head per year. The maximum was 665.69 liters and the minimum 351.31 liters.

The duration of the lactation of the animals 3 1-3 years old was 364 days as a maximum, 193 days as a minimum, 296 as an average. For the animals 14 months old the maximum during the lactation was 348 days, minimum 265 days, average 330 days.

The Nubian goat.—The Nubian goat is larger by half than the common species, and many who are unfamiliar with it take it at first glance for a horse, says one prominent writer. Below the top of the head the forehead rises so as to form a conical prominence, then sinks toward the nose until the nostrils are in an actual depression. The lower jaw protrudes beyond the upper and the teeth oftentimes extend above the nostrils. The ears are flat, long, large, and pendant. Sometimes, however, an individual is found with ears short, straight, and pointed. There is an entire absence of beard. The females have no horns; those of the male are flat and short and lie upon the back of the head; midway the horns are curved from within to without.

The udder is deeply indented, so as to form two very distinct lobes; the teats are situated, as in all species, upon the lower part of the udder, but in this breed upon the outside and below. The eyes are very large and lie flat in the head—do not protrude. The hair is usually quite long, deep brown or black, and quite fine.

There is no odor connected with this breed, even at rutting

SPANISH MALTESE BUCK.
Bred by B. H. Van Raub, Van Raub, Tex.

time, which occurs at all seasons of the year. It is an exceedingly prolific animal, having been known to give birth to as many as 11 kids during one year—4 on each of two occasions and 3 at another. No member of the goat family is more peaceful or gentle.

This breed is very sensitive to cold, apparently being unable to withstand even a slight degree. This necessitates a warm barn or goat house. They should never be sent to pasture when there is frost. We are informed that the slightest cold produces abortion. A ration of dry, nourishing food—good hay will answer the purpose—is always advisable.

Crosses of Nubian bucks upon other breeds of milch goats have been successful. Du Plessis says: "The half-bloods are more vigorous, better built, less delicate in their food requirements, and withstand the climate of France without the slightest injury."

The records show that the Nubian is the most productive milch goat known. Du Plessis says: "We have known Nubian goats of good constitutions, when intelligently handled, to give from 5.28 to 6.34 quarts per day."

There are reports of a few Nubian goats in the United States, but whether they are the real Nubian breed is not known to the writer. It is quite evident that they would not thrive in the colder sections of our country in their pure state; but they would undoubtedly do well in the South and half-breeds would be able to withstand a colder climate.

The Spanish-Maltese goat.—This breed of goats is found in Texas and New Mexico.

It is known that Spain imports from Malta a great many Maltese goats and it is said that during the last hundred years large numbers have been exported from Spain to Mexico, where they are known as the Spanish-Maltese. While this is the claim made for them, which carries the inference that they are the pure Malta goats under another name, there are many reasons to cause one to doubt that they are of the pure Maltese breed.

The following description of Spanish-Maltese breed is by B. H. Van Raub, of Van Raub, Tex., who has been a breeder of them for more than twenty years: "The Spanish-Maltese goat is about the average size of the common or the Angora goat, possibly a little larger. It is white or grayish in color, but many have brown, bluish black, or reddish spots. Many have coarse hair, some have long, fine, silken hair, and some have short coarse hair. As a rule, they have pendulous ears, but there are some superior milkers having fox-like ears. There are more hornless,

SPANISH MALTESE DOE. Bred by B. H. Van Raub, Van Raub, Tex.

HORNLESS SPANISH MALTESE DOE.
Bred by B. H. Van Raub, Van Raub, Tex.

or muley, goats among the Spanish-Maltese than among any other breeds."

The description shows that there are two varieties of Spanish-Maltese goats, and the illustrations show them to be so different in many respects as to lead one to suspect them of being distinct breeds. The short-haired one has several markings which are characteristic of the Toggenburger and has very few markings of the pure Maltese. The long-haired one varies in form and feature from the pure Maltese.

It does not follow, however, that the Spanish-Maltese goats are not a good milch breed, even though they may not belong to the Maltese breed. There is no statement at hand to show what is the average daily production of milk or how long is the period of lactation, but if the does can be made to produce as much as 2 quarts daily under ordinary care, it should be considered well adapted to the goat dairy. Mr. Van Raub reports some which do much better than this.

The literature concerning milch goats in the United States is but little and that unimportant. So far as the writer knows, there has been but one importation of milch goats, and that about twelve years ago. These numbered about a dozen head of Toggenburgers. They have not seemed to thrive well here, but what it is in particular that prevents their thriving is not known to the writer. The remnant of the original importations is somewhere in Indiana at this time. It is probable that if they were taken into the mountains to a location like that from which they came, they would do better than they are now doing.

Switzerland, Italy, Germany, France, Spain, Egypt, and Malta, all have milch goats of great worth, but, unfortunately, the United States has found it necessary to established a prohibitive quarantine against all these countries because of the presence in them of contagious diseases of domestic animals. Fairly good animals may be secured in England, but none of pure blood. England found it necessary to evolve an "English" goat, just as we may find it necessary here to produce an "American" goat.

There is no registration in the United States for milch goats of any breed. England has a registration, and as any importations we may make for some years are likely to come from that country, it would be well if registration papers were secured of all goats and held until such time as an association might be formed here. As soon as we in this country produce a goat that will yield as much as 2 quarts of milk per day, with a period of lactation of

5 or 6 months, it will then be time to think seriously of a registration association. Until such an organization is formed, let the breeder keep a record of his goats' performances in the production of milk; stated otherwise, let each breeder have an individual record for his flock. These will in time prove of great value to the milch goat industry.

The skins are among the best of the goat kind, and they add a little to the profits of the industry. There should be no difficulty in disposing of them wherever hides are handled. There are many tanneries in our country that use them and they import millions of dollars' worth annually. There would be no profit in raising these goats for their skins alone, or even for both their meat and skins. The value of our imports of goatskins for a series of years is given in the chapter on "Minor matters of importance."

These goats will destroy brushwood as readily and completely as the Angoras, but in doing so they produce a poor quality of milk and not much of it, and the period of lactation is shorter than if stall fed. An Angora succeeds in excellent manner in converting brushwood into mohair, but the dairy goat can not convert the same sort of feed into good milk.

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